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What May Accountancy Teach Economics?

By Frederick A. Cleveland, Ph.D.

Before attempting reply to the subject assigned by the Secretary of the Social Science group of your Association, it will be necessary to define the meaning of the term "economics." If you are asking for an expression of opinion as to what accountancy may teach a Physiocrat, a Malthusian, a Nationalist, a Richardian, a Walkerian, a Marxian, or any of the many schools of economic dogma and speculation, then a categorical answer must follow. If the word "economics" raises to your minds concepts of the abstinence theory of capital, the marginal theory of rent, the residual theory of labor, the quantity theory of money, the utilitarian theory of value, and the many other refinements of reason which have proceeded from the dim light of the academy undisturbed by the common brute facts of business, then again the answer will be—nothing. If by "economics" is meant cumulated cargoes of books and pamphlets that have been written by those who have proceeded from commonplace assumptions and who by processes of *a priori* reasoning have evolved a medley of philosophies which treat on subjects of economic rights and economic wrongs—a jargon of creeds each of which through hortative address would point the way to industrial peace and social salvation—the same answer must be given. To dogmatist and abstract theorist accountancy can render little service.

Indeed question has been raised by the economists themselves as to the scientific value or advantage of that voluminous literature which is grouped in our libraries under the title "Political

Economy." So complex have these dogmas become and so far afield are they from the increasingly complex affairs of modern life that the theorist is beginning to doubt the virtue of his own speculation as well as the honesty of intellectual processes and methods by which conclusions have been reached. Speaking to this point before the American Economic Association, December 1st, Dr. Hollander, Professor of Economics of Johns-Hopkins University, in a brilliant address called attention to the fact that after nearly a century of speculation the economic theorist had not formulated a doctrine or reached a conclusion which by the most optimistic stretch could be termed a scientific interpretation of industrial activity. Two years before, in discussion before the same National body on the subject of corporate loan credit, it was pointed out that "the scientific method seems not to have won a place among those who have devoted themselves to economic inquiry"; and similar criticism was offered, viz.: "that there has not to this time been a single conclusion reached that may be accepted without controversy."

Those who have a sympathetic appreciation of the meaning of science "realize a striking contrast" between the methods employed in the search for an economic "theory" and the method pursued in the establishment of any "principle" of exact science. Yet it is admitted that the facts of business are such that they may be collected, classified and co-ordinated around subjects of scientific interest, and that the data of economics are even more amenable to research than the ascertainable facts of geology, and quite as accessible as are the data of botany, physiology and astronomy. From the point of view of science, the fault has been with the economist in not applying to this field of human interest methods of research, the reason for which as assigned by Prof. Hollander being that "it is much easier to spin cobwebs about the theory of distribution in a closet than to describe and present the actual facts."

Regarding economics as a branch of science instead of accepting it as a theory or as speculative philosophy, it may be defined as that subject or field of human inquiry which has to do with the group activity of man toward individual or social gain —i. e., toward obtaining the largest possible return at the smallest possible expense.

Preliminary to research a common point of view must be

recognized and established. As determining the character and classification of data to be collected, the following preliminary considerations are suggested.

INTRODUCTORY CONSIDERATIONS: I. E., FACTS DETERMINING THE CHARACTER OF RESEARCH TO BE UNDERTAKEN.

I. Economic Factors to be considered.

A. Man.

1 The data for the Science—man's group efforts directed toward gain.

2 The nature of economic effort—co-operative.

3 Motive to economic geroueffort—to obtain the means necessary to the satisfaction of want—Psychological.

4 Necessities out of which wants arise.

a Individual necessities giving form and direction to effort.

1 Food.	Pathological.
2 Shelter.	Physiological.
3 Clothing.	Hygienic.
4 Heat.	
5 Light.	

b Social necessities which give direction to economic effort.

1 The group necessity for the propagation of kind and for making provision for the care and comfort of the individual—the family.

2 The group necessity for protection and for the maintenance of order—government.

3 The group necessity for the adjustment of the established order (law and government) to new condition of welfare—politics and partisan organization.

4 The group necessity for common ideals, common thought, common impulses

and community interests as an incident to social co-operation—institutions of culture, education, art, morals, religion, etc.

5 The group advantage and desirability of making provisions for group comforts and enjoyments, the social club, the fraternity, institutions for recreation, etc.

B. Nature.

1 Character and distribution of materials capable of supplying want or satisfying desires—economic geography and the materials of industry.

2 Forces which may be utilized in economic activity —Dynamics.

3 Mechanical devices by which forces may be employed to obtain economic results—mechanics.

II. Economic relations to be considered: i. e., Relations arising from association and co-operation in the performance of economic functions.

A. Economic Social relations of man to the material world.

1 Ownership—based on the right of a person to the exclusive use and control over materials acquired for his own benefit.

2 Leasehold—based on the right of one person to use that which is owned by another.

3 Trusteeship—based on the right of one person to own and control property for the benefit of another.

a Lien control—as security for credit.

b Bailment—the possession and care of property of another.

c Receivership—the possession of the property of a person by a court, pending the adjudication of relations in dispute.

B. Economic Relations of man to man in institutions of Social and Public Welfare.

1 Husband and wife.
2 Parent and child.
3 Governor and governed.
4 Political leader and party member, etc.

C. Economic Relations of man to man in institutions of private gain.

1 In the organization of group activity.
   a Promoter and Entrepreneur.
2 In ownership and control.
   a Co-partners.
   b Corporate Membership.
   c "Community" members.
3 In the capitalization of enterprise.
   a Individual Investors.
   b Joint stock contributors.
   c Debtor and creditor.
   d Leasor and Leasee.
4 In the management and service rendered.
   a Employer and employee.
   b Practitioner and client.
   c Principal and agent.
   d Beneficiary and trustee.
   e Insurer and insured.
   f Guarantor and guaranteed.
   g Special service relations—such as—carrier, hotel keeper, etc.

III. Forms of Economic Incomes to be considered—i. e., the different form of income arising for each different relations established, as,

A. Public Incomes.

1 Taxes.
2 Licenses.
3 Dues.
4 Tuitions.
5 Contributions.
6 Bequests.

B. Private Incomes.

1 Promoters' Shares.
2 Partners' Drawings.
3 Dividends to Shareholders.

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1 Promoters' Shares.
2 Partners' Drawings.
3 Dividends to Shareholders.

4 "Community" Interests.
5 Individual profits.
6 Corporate Surplus.
7 Interest.
8 Rent.
9 Salaries and wages.
10 Professional fees.
11 Compensation to agents.
12 Premiums on Insurance.
13 Fares and tolls for carriers.
14 Rates for special services—as telephone, telegraph, hotel accommodation, etc.

A consideration of the foregoing factors, relations and forms of economic return are to be regarded as necessary to a proper direction of research within the field of economics. That is to say, a proper appreciation of the facts of economic life depends on recognition of economic effort as social; our premises having relation to the economic motive, if scientific, must be taken from psychological research; a correct view of individual necessities must be in the nature of conclusions reached by hygiene, physiology, pathology, etc.; data of business, public or private, so far as it is based on social necessity, may be understood only as we have before us the family, the government, the political party, the church, the school, the club, etc.; scientific judgment pertaining to the character and location of useful materials must come from economic geography, and from a study of the materials of industry; working hypotheses, in so far as they have to do with the forces of nature and with mechanics by which these forces may be utilized, must be taken from Dynamics and Mechanics. Furthermore, those relations established between man and nature, and man and man, which we may call economic, being social in character, have been given form and expression in law, and in custom which has the force of law, and the several forms of income, in a free social, such as our own, are determined by definite political action or by contract. Having thus taken our bearings from allied science, we turn to the data which pertain to the group activities directed toward individual gain or public welfare.

CLASSIFICATION OF DATA PERTAINING TO ECONOMIC GROUP ACTIVITY.

I. The character of the institution or group.

A. Social or Political institutions having economic functions.

1 The state.

2 The political party.

3 The school, church and other cultural societies.

4 The family, the fraternity, the club, etc.

B. Institutions organized for private use—classified according to the activities or functions undertaken.

1 Institutions for organization and promotion.

2 Institutions for investment and capitalization and current financial aid.

a Underwriting companies.

b Stock and bond syndicates.

c Savings banks.

d Building loan associations.

e Mortgage loan and investment companies.

f Trust companies.

g Pawn shops.

h Commercial banks, etc.

3 Institutions for insurance and guarantee.

a Life insurance companies.

b Marine insurance.

c Fire insurance.

d Accident insurance.

e Storm and casualty.

f Title guarantee.

g Fidelity insurance.

h Credit insurance and Guaranty.

4 Operative Concerns—Classified by Functions.

a Associations formed for the acquisition of materials—extractive industries.

1 Agricultural.

2 Horticultural.

3 Fruit raising.

4 Stock raising.

5 Market gardening.
6 Irrigation.
7 Timber culture.
8 Mineral producing.
9 Oil and natural gas production.
10 Water pumping and storing.
11 Fishing.
a Deep sea fishing.
b Trap and net fishing.
c Oyster farming.
12 Logging and wood cutting.

b Associations formed for purposes of manufacture.
1 Of production goods, i. e., Machinery, Equipment and Supplies. (These follow the same classification as the operative industries themselves.)
2 Consumption Goods: i. e., Things intended to supply human want and to satisfy human desires. (These may be classified according to the individual and group necessities above noted.)

c Associations formed for purposes of exchange.
1 The trading company.
2 The booking company.
a Real Estate brokers.
b Stock brokers.
c Produce brokers, etc.
3 The stock and produce exchange.
4 The market company.
a Stock yards.
b Flower markets.
c Produce markets, etc.

d Associations formed for purposes of special service.
1 Employment—employment agencies.
2 Professional service—professional firms, hospitals, etc.

3 Transportation.
- a Railway companies.
- b Urban and interurban car line companies.
- c Turnpike, bridge and ferry companies.
- d Canal companies.
- e Steamboat companies.
- f Dock and warehouse companies.
- g Express and baggage companies.
- h Draying and trucking companies.
- i Cab and livery companies.

4 Communication.
- a Telegraph and cable companies.
- b Telephone companies.
- c Commercial messenger companies.

5 Property Storage.
- a Warehouse companies.
- b Safe Deposit companies.

6 Personal Comfort and Service.
- a Hotel companies.
- b Restaurants, barber shops, hair dressers and bath houses.

II. Relations of Proprietorship and Administrative Control.

A. The nature of the proprietary.
- 1 Individual owner.
- 2 Copartnership.
  - *a* Limited.
  - *b* Unlimited.
- 3 Corporation.
  - *a* Joint-stock.
  - *b* Non-share-holding and mutual benefit.
- 4 The "Community."

B. The organization of the proprietary.
- 1 Copartnership.
  - *a* Active and silent.
  - *b* General rights.
  - *c* Stipulations limiting.
- 2 Corporation.

a Stock proprietors.
1 Relations of
a Common.
b Preferred.
c Other
2 Corporate privileges of
a In elections
1 Provisions for calling and holding.
2 Quorum.
3 Use of proxies.
4 Other provisions.
b Rights with reference to amendments to charter and plan of organization.
b Plan of organization.
1 Of Directory.
a Membership.
(a) Number.
(b) Tenure.
b Continuous or non-continuous.
c Majority and minority representatives.
2 Of Officers and Managing Agents.
a Classification.
b Qualification.
c Powers and rules.
d Limitations of powers.
C. Forms of control as determined by proprietorship.
1 Proprietary Control.
a By Stockholders.
b By Members.
c By Beneficiaries and Mutual Companies.
2 Representatives or Board Control by trustees or directors.
a Majority Control.
b Minority Control.
3 Official Control by Officers and Agents.
D. Relations of Management and Service.

1 Divisions of service by Departments, Sub-Departments for purposes of control.
2 Manner of employment as an incident to management.
3 Arrangements for special service.
a Professional advice.
b Communication.
c Transportation.
d Exchange.

E. Means by which Central Control may be exercised.
1 Through Organized Inspection.
2 Through Controlling Accounts.
3 Through Current Statements and Reports based on inspection and controlled account.

F. Relations of capitalization and equipment.
1 Capital Contributions.
a By Proprietors.
1 By Single Proprietor.
2 By Copartners.
a Silent.
b Active.
3 By Joint Shareholders.
a Common.
b Preferred.
4 By Members or Non-Shareholders.
b By Creditors.
1 By Secured Creditors.
a Mortgages.
b Bondholders.
c Others.
2 By Unsecured Creditors.
a Temporary loans.
b Debentures.
2 Capital Equipment: i. e., Properties procured by capitalization for continuous or permanent use in the business.
a Lands, Buildings and mechanical equipment owned by the Company.
1 Sites.
2 Buildings.

3 Fixtures.
4 Machinery.
5 Power.
6 Tools.
7 Patent-rights, trademarks, etc.

b Capital Funds.
1 Amortization Funds.
a Sinking Funds.
b Other.
2 Capital Reserve Funds.
a For depreciation.
b For new equipment, proceeds from bond sales, etc.

c Capital Advances.
1 On Lease-holds.
2 On Insurance.
3 Other Advances.

d Good-will, etc.

G. Current Financial Relations.
1 Having to do with solvency and insolvency.
a Current Assets and Liabilities.
b Current Deficit and Surplus.
2 Having to do with relations of economy.
a Earnings.
1 Sales—Less direct cash or net sales.
2 Other forms of earnings determined by the form of the enterprise—as fares, fees, tolls, loading, net premiums, rents, commissions, interest, etc.

b Expenses.
1 Expenses of operation.
a Salaries and Wages.
b Supplies—cost of materials consumed and which do not apply to the direct cost of goods produced.
2 Maintenance.
a Repairs and Replacements.
b Depreciation.

3 General Property Expenses.
a Taxes.
b Rents on Properties Leased.
c Interest.
d Insurance.
e Other.
4 Other Expenses.
a Contributions to Politics, Charity, etc.
c Net Earnings.
3 Having to do with Profit and Loss.
a Gains.
1 Net Earnings.
2 Gains or premiums from sale of capital liabilities—as bonds, stocks, etc.
3 Gains from sales of capital assets—as sites, plant, etc.,
4 Gains from Application.
5 Other gains.
b Losses.
1 Net expenses from operation over earnings.
2 Losses or discount on sales of capital liabilities.
3 Losses on sales of capital assets.
4 Losses from depreciation.
5 Losses from fire, flood, strikes, etc.
6 Oil Losses.
c Net gains or losses.
4 Having to do with relations of distribution.
a Surplus—cumulated out of profits.
b Distribution of surplus.
1 Dividends.
2 Reserves.
3 Undistributed surplus.

III. Economic Processes and Industrial Technique—following the general outline of functions and activities.

In proposing the foregoing introductory considerations and tentative outline for classification and final co-ordination of data collected, it is to be noted that no premise is taken as a basis for *a priori* reasoning, our only assumptions being, (1) that

there are certain economic factors to be considered; (2) that in society as constituted certain definite economic relations exist; (3) that as consideration for entering into these relations, different forms of income accrue; (4) that for purposes of productive income certain economic institutions have been evolved which may be systematically studied; (5) that institutional functions and activities may be classified; (6) that administration comprehends, not of a knowledge of the several economic relations and the several forms of organization and activity developed, but depends on such an adjustment of expenditure to income as to produce a net gain. These are conceived to be the general subjects of economic interest to which may be applied a scientific method of research.

WHAT HAS BEEN DONE TO LAY THE FOUNDATION FOR ECONOMIC RESEARCH.

Already considerable progress has been made along these lines. The subjects preliminary to economic research have been developed by students and writers who have not assumed the rôle of economist. Those data pertaining to the economic factor, man, have been collected and classified by students of government, politics, education, religion, morals, psychology, penology, sociology, hygiene, etc.; those data pertaining to the second factor, nature, have found classification in their relation; (1) to the character and distribution of natural elements capable of supplying human needs and satisfying human desire; (2) to the mechanism and forces available to man or invented by him for the purpose of making these natural elements available for use or as they may contribute directly to comfort and enjoyment. Among the specialized economic sciences that may be, or which have been, here recognized and established are economic geography and the materials of industry, mechanics and dynamics. The last two named have already been developed to a high degree of sub-specialization. For purposes of research, dynamics, for example, has been divided to include hydro-dynamics, electro-dynamics, thermo-dynamics, vapro-dynamics and explosives, and may be still further developed to include a scientific treatment of vitro dynamics or labor.

Pertaining to "Economic Relations," complete data are available to the economist. The several forms of economic income

(being governed by law, and by contract and custom enforceable in law) may also be definitely determined. For the purposes of scientific discussion, therefore, each of these lends itself to an analysis of the group advantages, and individual motives which lie back or determine the law, the contract or the custom under which economic relations are established and in consideration for which the incomes accrue. Instead of assuming that all incomes are either rents, wages, interest or profits, the exact forms of income having been scientifically determined from a study of group relations as they exist, research may be projected and conclusions reached which may be useful to society in understanding problems of public and private concern, whether they pertain to the factory, the mine, the home, the school, the political party or the government.

THE DEVELOPMENT OF ECONOMIC RESEARCH.

Turning to the field Economic Research (Economic Institutions, Proprietorship and Administration and Economic Processes), it is to be noted that very little has been accomplished in the direction of developing a systematic literature, only a few subjects in the outline have been scientifically considered. Savings Banks, Trust Companies, Commercial Banks, Building Loan Associations are among the financial institutions that have received attention by those who have proceeded from the standpoint of research. A few general theses have been written on the subjects of commerce, transportations, industrial processes, and financial method, but, generally speaking, financial and operative technique has been only lightly touched, while the data of administration have remained uncollected, except in so far as the same has been brought together by the accountant in considering the affairs of particular institutions. Public corporations and public administration are practically the only phases of economic life and group activity that have been seriously approached by the academician, and our scientific literature pertaining to these has been produced by the student of history and public law rather than by the economist.

Scientific economics may be regarded as a new and open field —as one which not only lends itself to scientific research, but one which also promises the largest return to those who will seriously contemplate a scheme of collaboration for the orderly collection and classification of facts. In this plan of collaboration, each

separate class of institution may be taken as a distinct subject of research; the data may be collected, classified and presented in relation (1) to organization; (2) to problems of administration, (3) to methods and technique. In other words, by making some logical division and classification, each student in economics may do what the botanist, the zoölogist, the physiologist and other exact scientists have set for themselves intelligently to do, viz.: having a clear map of the field before him, he undertakes to collect, classify and present in scientific form the data pertaining to parts still undeveloped.

Proceeding from scientific conclusions made available by others, using these conclusions reached from consideration of known facts, as a working hypothesis for the prevision of facts—unknown, through co-operative effort, the student of economics may gradually reduce the data of business relations, business organization, business administration and business technique, to an exact science. In other words, if our college and university departments of economics might forget the dogmas of Adam Smith, of Ricardo, Malthus, Mill, Bonar, Boehm-Bawerk, Karl Marx and others, leaving these delectable intellectual pastimes and social creeds to those who devote their time to public morals and politics; if they might forget such fundamental assumptions as "all wealth is the result of the combination of land, labor and capital," assumptions made for the purpose of proving that one class or another is entitled to a greater or smaller distributive share of economic goods; if they will lay aside the various speculative concepts which for hortatory purposes make it necessary to hypothecate absurdities such as "land includes not only the earth or the sea but also the light and warmth of the sun, the restful, quiet and fascination of the moon, and the forces of wind and storm" (utterly ignoring questions of fact); if they might disregard such ingenious and dogmatic indifferences to truth, as that rent is the net return on marginal protectiveness, or that interest is the net income from buildings, ships, etc., without considering relations of landlord and tenant, debtor and creditor; if forgetting these dogmas which have been learned after years of studious efforts, they might adopt the method of intelligent research on subjects of the common concern, and free themselves from the intellectual spell which has hung over "the dismal science" like a pall since the Dark Ages, we may within a few

years have developed a scientific literature of economics whose conclusions would be both sound and useful to mankind.

THE FIELD AND METHOD OF ACCOUNTANCY.

Taking from science our concept or definition of economics, assuming that it is desirable to apply scientific methods to the development of economic truth, the question, What may accountancy teach economics? becomes a pertinent one. The field of accountancy is the field of scientific economics. More particularly it concerns itself with relations of "proprietorship and administration." Its service is not operative, but advisory—having to do with problems of administrative control. Its advice proceeds along the lines of *a posteriori* reasoning. Its method is one of scientific research. In application of this method to the data of business it has developed a well defined scientific technique. This technique, when resolved into its simplest elements, finds expression in three forms of records, viz.: (1) The day book, in which is collected all transactions of a business chronologically as they occur. (2) The journal, which records the classification of these data. (3) The ledger, in which the data so classified are finally co-ordinated around subjects of definite administration interest, and which when summarized and recapitulated in relation to operative and physical data are rendered in the form of statements and reports. Whatever be the many devices and contrivances employed in collecting and classifying data and co-ordinating results, while adapting the technique of accountancy to the institutional need, they all relate themselves directly to these elementary principles. So complete and scientifically accurate may be the information thus obtained, if these instruments are properly used, that an error in a single entry among a thousand, or a mistake of a cent among transactions amounting to millions of dollars, will throw the whole machinery of accounting control into confusion till the error is located and adjusted.

AN INTELLIGENT PERCEPTION OF AFFAIRS THROUGH ACCOUNTANCY.

Under conditions of modern centralization and consolidation for purposes of economic group activity, the great problem of successful management is one of *intelligent control*. The exercise of sound discretion for purposes of control presumes an exact knowledge, not only of the remotest details of the business administered on, but also a clear perception of group relations,

financial conditions and operative results, expressed in terms of asset and liability, income and expense, gain and loss. Employing methods of scientific research which comprehend every transaction and detail, accountancy holds itself out as capable of giving advice. Through the processes of audit and critical examination, accountancy undertakes to discover and report on points in the administration where control is weak or wanting; devising, installing and supervising systems of account, it attempts to adjust the technique of financial and operative control to the administrative need; interpreting facts and results obtained, it would point the way to an adjustment in economic relations, to change in organization, to modifications in activities and operative technique, the need for change in which may prove of advantage to proprietors and others interested in the enterprise.

THE LIMITATIONS OF ACCOUNTANCY.

Applying methods and instruments of science to the administrative purpose, however, accountancy confines its investigation and its report to a single institution. While the value of professional service depends on a breadth of view and a co-ordinating ability that holds in contemplation many institutions of the class under examination, the diagnosis is for purposes of giving advice to those interested in a particular concern—in this is its limitation. Accountancy is to Scientific Economics, what the clinic is to medicine. The examination made by the professional accountant is for purposes of prescription. A record of the diagnosis, of the prescription, of the remedial result, and of the history of the performance of normal physiological functions recorded in the accounts, may be taken as the data upon which broad scientific generalization may be based; this broad generalization should be made by the economist.

Let us turn the question around and ask—What may Scientific Economics do for Accountancy? The professional accountant when called in to make an audit, or to prescribe a system of control, must study the institution in all its relations; he must consider its functions; he must collect data showing results obtained. At the time he enters on the engagement he is presumed to be thoroughly informed on matters of organization, relations of capitalization and equipment to function and result, on operative

and financial technique, on methods of administration. Where is such information to be had? Until the economist has supplied a scientific literature, the accountant must wait the time when contact and personal observation will enable him to gather a fund of knowledge from contact such as will make his judgment valuable to a client. But if the economist is to produce scientific literature, he must obtain his data in part by going out into the field and collecting and classifying them himself. As well might a botanist seek to develop a science of plant life from a balloon as for an economist to try to develop a science of business from the academy or to teach scientific economics without a literature on the subject. A single individual never has, and never will, construct a science. To collect and classify the data of a field so broad and containing such a variety of facts as is found in modern industry and commerce, requires a thousand workers; it requires an intelligent plan for co-operative research; it requires a method which will give authority to results and enable conclusions to be verified; it requires a terminology which will enable each to avail himself of the labor of all.

Again reverting to the question, it may be said that so long as speculative method and dogmatic assumption are employed by the economist, accountancy has little or nothing to offer. If, however, economics may become a science of business, public or private, not only may all the results of institutional research in the field of accountancy pertaining to relations of proprietorship and problems of administration (relations of capitalization, equipment, income and expense, profit and loss, distribution and surplus) be made useful to the economist, but the broader correlations of the student of economic research, if given literary expression, would be of inestimable value to the accountant, to the business man, to the publicist and to the citizen, in the performance of their respective duties to society.

Types of Street Railway Consolidation.

By Edward Preston Moxey, Jr.

It has been only in the past few years that the street railway business has presented more than a local interest. This has been due to the introduction of electricity, which has made possible a speed which was thought wholly impossible a few years ago, and by the offering to the prospective investor a great variety of securities based on the consolidations of small companies into large systems.

The street railway industry is one in which the elements of combination have always been present. The old idea of competition among different lines existed more in theory than in practice. In Philadelphia, for example, in the year following the opening of the first street car lines, there was organized a board composed of the presidents of the various street car lines, whose object it was to control definitely all the actions of the companies represented. Throughout the long history of that board, from 1859 to 1895 when the complete consolidation of the street railway companies was accomplished, only one attempt was made to oppose its authority and that resulted in failure. The absence of competition in the street railway industry was due to the fact that one company usually controlled the exclusive right to operate on a certain street or in a certain section of a city, the area served by the different lines overlapping but slightly. In fact the laws of Pennsylvania distinctly stipulate that when a company holds a franchise on any street, any other company is barred from the use of that street. In some cases parallel lines have existed in the same city which, to a limited extent, competed for traffic by improvements in service, such improvement generally taking a form of increased speed. This was the case in the street railway history of New York where different companies operated on the same and parallel streets.

The monopolistic character of the street railway business furnished an excellent opportunity for combination, and it was not long before consolidation began to take place. The history of such consolidation may be divided into certain well de-

fined periods, each characterized by a particular step in the process of combination. Previous to 1880, we have a record of minor consolidations for purposes of operation, which did not materially affect the general street railway situation. For example, one of the street car lines connecting that portion of the city of Philadelphia east of the Schuylkill River with the portion lying to the west, leased a line whose territory was confined exclusively to the west of the river. By this lease the territory of the lessee was extended, the line of the lessor being a good feeder to the system so formed.

About 1880 a change occurred in street railway management, and from that time until the introduction of mechanical traction the current began to set strongly toward legal monopoly. The third period of consolidation was ushered in by the substitution of electric for animal traction. The predominating motive back of combination was the desire to cheapen the cost of operation. The first reduction in cost was in the management of the different companies. The old horse-car lines represented one of the simplest types of corporation management, where little executive direction was needed and whose superintendence was limited to the care of the animal stock and the adjustment of a limited number of cars to the traffic requirements. The change of animal to electric traction created a new set of conditions which demanded men of special ability. The *Commercial and Financial Chronicle* in 1898 in commenting upon this subject said:—"Mechanical power at once introduced delicate problems of operation, and the possibilities of electricity in speed and carrying capacity opened a new field for street railroads and magnified their importance. The financial management of the larger of such companies, their general administration and the direct control of the operating power, require men of high talent in these various branches, and within the comparatively short period since the introduction of the electric railway a body of trained officers has been developed with special experience for their management. As in the early history of steam railroads, the work has largely created its own first administrators who occupy a new and growing field in human industry."

Not only could better management be secured by combination, but, what was far more important, the cost of physical operation could be considerably reduced. In Philadelphia, prior to the

formation of the Union Traction Company, the annual operating expenses of all the lines which later formed the consolidation were as follows:—

Fiscal Year.	Gross Earnings.	Operating Expenses.	Net Earnings.	Ratio of Op. Expenses to Gross Earnings.
1893	$ 8,691,923	$5,556,991	$3,134,932	64%
1894	8,431,105	5,431,515	2,989,590	64%
1895	9,848,270	5,916,477	3,931,793	60%
1896	10,759,705	5,707,435	5,052,270	53%
1897	10,907,451	5,260,583	5,646,868	49%
1898	11,236,437	4,619,375	6,617,062	41%

The above table shows very clearly three important facts. The gross earnings show an increase due to the natural growth in the business, this growth being due entirely to the increase in the number of passengers carried by the total lines. The ratio of operating expenses to gross earnings has declined. The advantages of consolidation are shown directly. It will be noted that prior to 1895, the year the Union Traction Company was organized, the ratio of operating expenses to gross earnings was over 60%. In 1896, the first year after the consolidation of the three more important systems into the Union Traction Company, this ratio had declined to 53%, and in 1898 when the final consolidation took place the ratio fell to 41%.

In commenting upon the above table, Messrs. F. T. & P. M. Chandler in a booklet entitled "The Union Traction Company" say: "These operating ratios thus plainly indicate first, the benefit arising from the substitution of mechanical traction for animal power, a benefit disclosed even in 1895 before consolidation; second, the great advantages arising from consolidation, and third, the gains from elimination of all competition.

"A word in reference to the apparently abnormal reduction in the ratio of operating expenses deserves, however, to be said, in that while such a reduction might ordinarily attract criticism, it has been due not only to the causes just mentioned, but also to the admirable management which the property has enjoyed through the peculiar ability of Mr. John B. Parsons, the President, to reduce car mileage, increase car capacity, and effect other economies in operation.

The fourth period of combination, beginning about 1900, is one characterized by the formation of companies created for the purpose of holding the securities of street railway lines and the securities of other companies engaged in allied fields of industry, notably gas and electric lighting.

Let us now turn our attention to the methods by which consolidation has been accomplished. These can readily be divided into three general classes:—Merger, lease and stock ownership. The simplest form of combination is that furnished by the merger. One company will purchase another outright, issuing therefor its own securities, the absorbed company going out of existence. Or a new corporation may be formed for the purpose of buying outright several independent companies. Perhaps the greater number of street railway consolidations have been brought about by this method, and it is the form generally employed in medium sized cities.

The great benefit arising from the employment of the merger is in the simplification of the whole financial structure of the consolidated companies. This can the more readily be done as practically all the bonds of passenger railways are short term and usually subject to call by the issuing company at any interest period at a given price. The natural result has been that a new corporation formed for the purpose of uniting several street railway lines takes advantage of this and calls the bonds of the absorbed companies, giving in exchange therefor its own bonds, usually at lower rates of interest on account of the greater security offered by the consolidation.

One of the best instances of the use of the merger and its resulting simplification of the financial structure of the whole consolidation is the International Traction Company of Buffalo, N. Y. This company was incorporated in 1899, and operated a number of street railways in and around Buffalo. In 1902, the traction company incorporated the International Railway Company, all of whose stock it owned. All the constituent companies were then consolidated into the railway company which became the sole operating company. The bonds of the underlying companies were called and paid, the funds being provided by a collateral trust loan issued by the traction company, secured by the stock of the railway company. By this process, the original

companies were supplanted by the railway company, and the International Traction Company became a holding company.

It might be supposed that the merger would be defective in that it entails upon the consolidated company a heavy financial burden, owing to the necessity of acquiring by purchase or exchange all of the stock of the constituent companies and providing for the payment of their bonds. This is not usually the case, however, since the savings brought about by a unified control generally more than offset any increase in the fixed charges. If the exchange of securities is made on an extravagant basis or the purchase of the stock made at a high figure, then the fixed charges of the new company are likely to be increased beyond the savings of combination and financial disaster is likely to occur. This was the case in the street railway history of New Orleans. The many foreclosures and receiverships of the street railway and lighting companies in that city show the danger and disadvantage of the merger method in over-capitalization of the consolidated company.

The second general method of consolidation is that furnished by the lease. This is particularly common in New York and Pennsylvania. In the latter state until 1901 there was no provision in the laws by which it was possible for companies to merge. The law did provide, however, for the leasing of street railways to traction companies, formed for the purpose of operating such roads. This condition was changed on May 29, 1901, when an act was approved by which it became lawful for any corporation to buy and own the capital stock of, and to merge its corporate rights, powers and privileges with and into those of any other corporation, so that by virtue of this act such corporations may consolidate, and so that all the properties, rights, franchises and privileges then by law vested in either of such corporations, so merged, shall be transferred to and vested in the corporation into which such merger shall be made, provided that nothing in this act shall be construed so as to permit railroad, canal and telegraph companies which own, operate, or in any way control parallel or competing roads, canals or lines, to merge or combine.

As far as street railways are concerned this act was qualified by an act approved June 7, 1901, which provides that no street railway company shall be incorporated which shall not

have a continuous route, including branches and extensions, from the beginning to the end, including connections made with each of its branches and extensions or they with each other.

The operation of these laws is seen in the case of some of the underlying companies of the American Railways Company of Philadelphia. This company controls an extensive system of street railway lines in the eastern section of the United States. In 1903, in order to secure better operating results, a merger was effected between The Altoona & Logan Valley Electric Railway Co. and The Tyrone Electric Railway Co., whose lines met at Bellwood, Penna. Less than a month after this merger was accomplished The City Passenger Railway Co., which operated car lines in the city of Altoona, and was controlled by the American Railways Co., was merged into The Altoona & Logan Valley Electric Railway Co., under the title of Altoona & Logan Valley Electric Railway Co. The new company issued its consolidated mortgage bonds which took up the bonds of the merged companies.

The consolidation was possible in this case because all the lines concerned formed a continuous route; it would have been impossible to have merged the Scranton system of the American Railways Co. with the Altoona and Logan Valley as these lines do not form a continuous line.

Until the change in the laws of Pennsylvania made it possible for street railway ocmpanies to merge, the lease was the favorite means of consolidation. *The Street Railway Journal* for September 23, 1905, in speaking upon the organization of the Philadelphia Rapid Transit Co. said, "Practically all of the mergers of the underlying companies have been on the basis of long-time leases at guaranteed rentals on sliding scales." The terms of street railway leases are substantially the same. They provide for the payment by the lessee of the interest on the bonds of the lessor and all fixed charges, taxes, expenses, etc., and in addition a dividend on its stock where such stock had been on a dividend paying basis. Generally such dividend is on an increasing scale, the amount to be paid stockholders rising over a series of years to a fixed maximum.

Unlike the merger, the lease allows the subsidiary companies to maintain their corporate existence on which oftentimes depend certain grants or privileges. Since 1901, however, all rights and

privileges possessed by a street railway company connecting with another, is transferred upon merger to the new corporation.

Like the merger the lease possesses the advantage of as complete a consolidation, since the majority of leases run for 999 years. The dangers of this method to the lessee lie in the payment of exorbitant rentals, which in some cases, in addition to the interest on the bonded debt, have been as high as seventy per cent. per annum on the original capital invested in the property of the lessor; and also in the fact that usually no provision is made for the issue of the securities of the lessor company in order to provide the necessary funds for needed improvements whereby its property may become more valuable. Under such circumstances, the lessee is compelled in order to carry the improvements into effect to increase its own liabilities to provide the necessary funds which directly benefit the lessor.

From the standpoint of the lessor the amount of rental which it is to receive is of primary importance. Is this rental fixed, or is it subject to this and that curtailment to meet certain charges? The absence of well defined provisions, here, often results disastrously to the stockholders of the lessor company. A good example of this is furnished by the Thirteenth and Fifteenth Streets Passenger Railway Company of Philadelphia, which is leased to the Philadelphia Traction Co., one of the subsidiary companies of the Philadelphia Rapid Transit Co. For the year 1896, the rental under the lease was to have been an amount equal to ten per cent. on the capital stock of the company, payable semi-annually. The city of Philadelphia presented a claim for street paving which the company had to pay; in consequence of this the dividend due in January of that year was not paid, and the July dividend was reduced to four per cent.

A lease in order to be fair to both parties should be so drawn that the payments which are to be made by the lessee are clearly defined. Those made to the stockholders of the lessor should be made direct and subject to no curtailment, while those made to creditors should be stated in such terms that there can be no misinterpretation of them. These payments should include the interest on the bonds of the lessor, and all similar charges which the lessor is under obligations to pay. All damages due for accidents to persons or property should be borne by the lessee, as well as all taxes, whether federal, state or municipal.

In order to safeguard its own interests, the lessee should have the right to issue the securities of the lessor for needed improvements to the property of the latter. This right should not exist, however, without some restrictions attaching thereto. In every case the consent of the lessor must be obtained. If such consent is withheld, then a board of arbitration whose decision is final may pass upon the matter. In addition to the above, the improvements, for which stock or bonds of the lessor may be issued, must not be left to the discretion of the lessee; the lease should specifically enumerate such improvements and additions.

On the side of the lessor, in order to prevent the deterioration of its property at the hands of the lessee, the lease should provide for an annual inspection of the property by its board of directors at the expense of the lessee. Any unsatisfactory condition should be called to the attention of the lessee in writing, and if such advice should remain unheeded for a specified time, the lessor company should take possession of its property the same as if default in the payment of rental had occurred.

The purchase of the stock of operating companies, in order to secure control, forms the third general method of consolidation. There are several advantages attaching to the use of this method. Absolute control may be had through ownership of a majority of the stock of the subsidiary corporations. Besides this, all the economies of operation attaching to a large company become operative. These economies are effected through the purchase of standard cars, rails, ties, ballast, etc., for the entire system, which can be bought in quantities and at a better price than if bought by a smaller company.

Another saving which can be effected by the larger company is in the use which it can make of its equipment and other materials. Whenever a rail begins to wear a little on a much used track a new one is placed in its stead and the old one transferred to the line of a subsidiary company, where the traffic is light, and where it can be used for several years longer. The cars likewise can be shifted to suit traffic requirements. As heavier cars are placed on the more traveled lines, the smaller ones can be placed on the lines of lighter traffic and used to good advantage there. Of course it is obvious that this advantage cannot be enjoyed by the smaller company, with its smaller extent of territory. Not

only are cars and rails utilized in this way, but also such machinery as can be utilized finds its place in the power houses where less power is required, being placed there from those power plants in which larger and more powerful machines have been installed.

Possessing the financial ability lacking in the case of the small local company, the larger holding company is enabled to inaugurate a new standard and put in new improvements. Take a local line which is losing money for its owners. If such a road could build a few additional miles it would be in a position to tap a new and rapidly growing territory, which would cause a reversal of its history of losses and create a credit balance in its profit and loss account.

But the local interests look upon it in this way: "If the road as it is cannot earn enough to make a profit, why put more money into it? Good money will only follow bad and all will be lost." The holding company comes to the fore, and with its wider experience and knowledge takes over the small line, makes the necessary improvements, and the former losses are changed into profits. Besides the economies mentioned, the holding company is enabled to carry its own insurance. A self-insurance plan would not be practicable in the case of the small company without the resources of the consolidation behind it.

The holding company possesses the additional advantage that the securities of the lines purchased are usually secured at a very low figure. In fact one of the subsidiary companies of the American Railways Company was purchased under foreclosure proceedings, which made the cost to the holding company a purely nominal one. Then there is back of the organization of the holding company the idea of offering to the public a convenient form of investment through the flotation of the securities of the consolidation.

It must not be supposed that any one of the three types of consolidation set forth in this paper are used exclusively in the formation of a street railway system, for such is not the case. The American Railways Company furnishes a good illustration of the employment of all three methods. This company is itself a holding company, some of the subsidiary companies of which are formed by merger of smaller lines, while others are made up of a small system held together by lease. The Interborough-Metropolitan Company of New York, which controls all the

street railway lines of New York City, is another organization of the same type.

Consolidation of street railway lines is often effected without the formation of formally organized companies. The centralized ownership of a group of street railway enterprises by a few men really creates a situation having in it many of the features of an actually organized company whose avowed purpose it is to bring together such lines into one great system.

Factory Accounting as Applied to Machine Shops.

III.

By John Whitmore.

Absolutely all of the work of determining the cost of manufacture ought to be effective also for the purpose of controlling the cost. This applies of course to cost accounting and not at all to cost estimating. One may know exactly what materials ought to be used to produce certain finished goods, and on the basis of such knowledge costs may be estimated, but this does nothing to insure the proper consumption of materials, and so far no provision is made to detect excessive consumption. The same remarks apply to labor and to all other expenses of production.

But if materials are controlled in a storehouse and can only be obtained thence by means of orders which are used in the accounting to credit the storehouse and to debit the individual cost account, then a record of the consumption, whatever it may be, is created, and there come into existence the means of seeing whether things are right or wrong and of applying any necessary correction. The same is true of a completely distributed productive labor pay-roll.

The danger and the expense of wasted materials and wasted labor are known and borne in mind by all careful manufacturers, and the importance of safeguards against such waste is pretty generally appreciated. It may be repeated that such safeguards are created by means of accounting and not of estimating. The exact record is the only means of accurate knowledge, and accurate knowledge the only basis for systematic correction and improvement.

All this is to be borne in mind when we come to the accounting for factory capacity. If there is any difference it is that the conditions which exist in relation to the economical utilization of materials and labor, are intensified in relation to the economical utilization of factory capacity, for the reason that in regard to the last, standards of economy are less simple, less generally appreciated, and less strictly enforced.

Between the means ordinarily used in business management

and in cost accounts to watch the utilization of factory capacity and to deal with its cost, and a strict accounting for factory capacity, there is the same distinction that exists between estimates and strict accounts for materials and labor, that is, the strict accounting furnishes means of control which the other does not. It is worth while to be absolutely clear about this, and therefore to stop to consider what the means ordinarily used are.

In the first place, of course every factory manager knows that he needs a certain volume of work. The sales department exists to secure contracts which will keep the factory busy. If the factory equipment and products are of a simple character this insistence on volume of business together with vigilant supervision of the factory may pretty nearly meet the necessities of the case so far as utilization of factory capacity goes. It is doubtful whether it ever quite does so, unless in the case of continuous processes to make a uniform product. In machine shops some machines may be overcrowded and others idle, and much more than mere volume of business is needed to secure full utilization of the shop capacity.

Again the ordinary means of representing the cost of factory capacity in the cost accounts for the products are undoubtedly the ascertaining of the charges for factory capacity, and often for many other expenses together therewith, in a year's accounts, and the ascertaining of the ratio between the total of these and the productive labor charge, and thereafter the adding of the apparently necessary percentage to the productive labor item. If the factory is of a very simple character, and if the year's accounts from which the percentage is derived represent average full operation of the factory, something like accurate costs may be arrived at by these means. This is not saying much, as any degree of simplicity in operations and records may be supposed. Obviously no such simplicity exists in machine shop operations. The assumption in such a method is that factory equipment and labor are always utilized equally. Nothing could be further from the case in machine shops. Often expensive labor is used with slight use of machinery or small tools, and again the most expensive machinery is used with relatively little labor. Plainly in the case of machine shops the means ordinarily used for obtaining the full utilization of factory capacity and for determining the cost of the respective products are not calculated to really

accomplish either one or the other. They are in fact in some respects much weaker in comparison with an actual accounting for factory capacity, than estimates of materials and labor in relation to an actual accounting for the same, inasmuch as these estimates may represent what ought to be the facts, while a uniform percentage added to productive labor in machine shop cost accounts either has for its basis conditions which no longer exist, or is from first to last merely a makeshift.

It is worth while to consider carefully why the matter of accounting strictly for the use of factory capacity has not generally appealed to manufacturers as of equal importance with the accounting for materials and for productive labor. All manufacturers know that the cost of factory capacity, at least in the shape of repair and depreciation charges and taxes and insurance, enters into the cost of production as truly as does the cost of materials and the cost of labor. It is the total cost and not the details of the cost that is ultimately of importance. A dollar saved in the charge for plant employed is equal to a dollar saved in the materials used. The accounting for factory capacity is perhaps a matter of rather greater difficulty; the means of doing it are less understood. This may partly explain a lesser apparent interest in doing it. But it does not fully account for the average attitude toward the matter.

It seems probable that the average feeling is that the expenditures for materials and labor are current expenditures which are greater or less from day to day according as there is greater or less economy or waste, while the existence of the plant and the necessity of maintaining it are fixed facts entailing a practically fixed expenditure. By taking thought to-morrow's expenditure for materials or labor may be more or less, but not the expenditure which enters into the cost of the factory product as plant charges. If this is true it means that waste impresses the average man more or less according as its effect upon the cash account is immediate or remote, and that upon the same principle the outgoing dollar impresses him more than the incoming one. For to increase output so that a dollar of plant charges can be taken out of the cost of the former output as being a part of the cost of the new additional output which will be sold and paid for at least at its cost, is as profitable an operation as to reduce by a dollar the cost of materials or labor.

Or it is possible that the average feeling is that a return will be obtained for the plant expense as far as the product of the factory can be sold, and that as there is no other means of obtaining a return for it it is idle to count it up as if it were remaining cash. If this is the feeling it fails to take into account influences which have their effect upon human effort: the sense of opportunity, the sense of necessity, the exact knowledge of what ought to be done. It is for one thing to set at work these influences, to show exactly what factory capacity is unutilized and what the resulting loss is, that the accounting for factory capacity is set up.

Even the feeling that plant expense, including interest on the investment in plant, is less actual expenditure than the expense of materials and labor, or that it calls for less care in tracing it to its results, comes generally speaking from an inadequate view of things. Expenditure for plant is not made once for all time, nor is plant usually created to be worn out and to pass out of existence. The ordinary business condition is that investment in plant is continually being returned and being reinvested in plant. The investment which was made in the first place on a calculation of certain operation under certain future conditions is continually re-made with what ought to be an exact knowledge of actual operation under conditions actually existing. If an investment in plant is contemplated, one calculates whether in operation it will be profitable to the extent of paying all current expenses and a fair return upon capital. It is upon such a calculation that one creates a factory or buys a single machine. In actual operation one has the opportunity to compare alternative processes with varying machine and labor costs, and to learn not only whether a machine can be operated profitably, but whether by means of it the lowest costs of which one knows are obtained. And this knowledge should be the result of comparing cost figures which sum up all the facts, including the fact of the larger or smaller investment which the different processes necessitate.

If one can reduce the labor cost of production by increasing the machine cost, and vice versa, it follows that to compare labor costs only might lead to conclusions that would be modified and possibly reversed upon comparison of combined machine and labor costs. And if processes having higher costs are to be systematically eliminated in favor of those having lower costs, it is the complete cost of each that must be known and available for

quick use. And if plant expenses are actual costs, as materials and labor are actual costs, they must be included in cost accounts according to actually determined facts, and not by an arbitrary or makeshift distribution creating the appearance of profits or losses which are not actual, and furnishing an unsound basis for the selling operations.

For these reasons it is necessary to arrive as closely as possible at the hourly expense of each machine and to record machine time as accurately as a workman's time is recorded, and to charge the machine expense for the job into the cost account for the job, exactly as the labor expense is charged.

The hourly expense of each machine is made up of the expense of land and buildings and of the machine itself. The expense of land and buildings is first distributed to the several divisions of the plant that have to be dealt with separately in the cost accounts. What these divisions are depends upon the individual situation. Necessarily there is the storehouse with its own expense account, and the tool room with its own expense account, and various offices. Space not occupied by machines but used for assembling is dealt with separately. The space occupied by the power plant, the expenses of the power machinery, and all other expenses of power, are dealt with in a group, and are brought into the cost accounts by means of a charge per horse power hour for machines running. It is necessary to have a rate per hour for each machine chargeable in the cost account for the whole time the machine is engaged upon the job, including the time occupied in setting up the machine, in putting materials into it, and taking materials out of it, up to the time it is released ready for the next job. The power time, being the actual running time of the machine, is necessarily less than the machine time, so that the machine rate is chargeable for a certain number of hours and the power rate for a lesser number. The whole subject of the accounting for power expense, perhaps the most difficult problem in machine shop cost accounts, must be taken up by itself.

The first item in the machine rate is then the charge for factory space, the most convenient unit of which is the square foot of floor-space. This charge consists of the following items: 1. Interest on the cost of land; 2. Interest on the cost of buildings; 3. Expense of repairing buildings; 4. Charge for depreciation

of buildings; 5. Expense of heating and lighting buildings; 6. Insurance and taxes on land and buildings. The term buildings is here used as including certain working equipment, such as heating and lighting fixtures, elevators, wash-rooms, etc. These however should not be included with buildings in a single general ledger account, for they are as a rule subject to a higher rate of depreciation.

While buildings do not actually cover the land on which they stand, the floor-space in the buildings is chargeable with the whole expense of the land, unless some of the land is either unused or used for some purpose the expense of which is dealt with separately from the floor-space charge. Thus yard-space used for storage purposes is chargeable to storehouse expense, and not to the cost of factory floor-space. On the other hand, the yard-space which is necessary for purposes of light, and in order to handle work conveniently between the several shops, is properly treated as a part of the expense of factory floor-space.

When the total cost of floor-space has been ascertained, and the floor-space itself has been measured and the measurement of each separate room recorded, the total cost is divided by the total measurement, and the cost of the square foot of floor-space is arrived at. Then there is distributed to each room its proportionate cost, which in the case of machine shops fully occupied by machines is afterwards absorbed in the machine rates. Not all floor-space however is used for machines, or for directly productive operations. There is the storehouse space already alluded to, and there may be other space reserved for the storage of large castings in machine shops. All of this is charged to storehouse expense exactly as was the cost of yard-space used for storage purposes. And floor-space is needed for both factory and general offices, and the charges for these are added to the general factory expenses and the general office expenses respectively.

The next step is to measure the space taken by the individual machines. The manner of determining these measurements should always be carefully considered. Perhaps the best rule is to arrive at a four-sided rectangular space which will just suffice to accommodate the machine in operation, unless it is plain that this would include space which is either constantly or occasionally put to other uses. The total space in the shop, less the total space measured as occupied by machines, is the working

space which is to be regarded as existing for the benefit of the machines impartially, unless upon examination some distinction is recognized. If there is no such distinction then the space measured for each machine is to be increased by such a percentage as will complete the distribution of the shop space to machines. The machine space thus arrived at, at the cost per square foot already determined, is the first item in the expense of the machine for the year.

The next thing to take into consideration in determining a machine rate is the present value of the machine and its estimated remaining years of life. Upon these the interest and depreciation charges are based. An equitable charge for depreciation will probably be made if a rate is used which, written off the decreasing balances from year to year, will reduce a machine to ten per cent. of its cost by the end of its estimated lifetime. This gives the highest charge when a machine is new and presumably at its highest efficiency, both actual and relative, and a steadily decreasing charge from year to year.

Next there is the matter of the annual repair charge. Shop foremen can tell pretty well what the bare expense of maintaining a machine in working order is, exclusive of accidents. When such a figure is stated it may be doubled to cover repairs from all causes, in order to arrive at a roughly fair figure to use until actual records correct it. An actual record of the cost of repairing each machine should be kept in a machinery ledger. The machinery ledger contains an account for each machine, its number, and description, and location in the shops, and its value. Depreciation is written off each account from year to year, and the ledger is always kept in agreement with the machinery account in the general ledger. If machines are disposed of, the difference between book valuation and selling price or scrap value is known and the accounts are easily and accurately adjusted. Columns should be provided for the record of repairs: date, shop order number, and amount. As all records of repairs to machines, whether labor or material records, bear the number of the machine repaired, postings to the machine ledger accounts are easily made, and a continuous record of the cost of repairing each machine is created.

If power is transmitted by means of shafting, belting, and pulleys, we have to take into consideration the interest on the in-

vestment in the equipment, and the expense of keeping it in repair, and a fair depreciation charge. The average horse power taken by each machine when in operation is calculated as closely as it is possible to do this, and the sum of these figures, being the average horse power taken by all the machines in operation, is arrived at. The expense of interest, repairs, and depreciation, upon shafting, belting, and pulleys, is divided by this total horse power to determine what charge in each machine rate, per unit of power required to operate, will take up this expense. If all the machines in operation would, to use mere round figures throughout, take 100 horse power available at the machines, that is exclusive of power lost in transmission, and if the total expense attaching to the transmission equipment were $1,000 per annum, and if a certain machine is calculated to use on an average two horse power when in operation, the resulting charge in the yearly expense for that machine is $20.

The next expense that has to be dealt with is the expense of cranes. The process of figuring this expense is very similar to the process of figuring the expense of a machine tool. There may or may not be a floor-space charge. There is always interest on the investment in the crane and the expenses of repairs and depreciation. Then there is an estimate, and necessarily it is an estimate only, of the power used by the crane. A shop foreman knowing the average use of a crane and an engineer able to make an approximate calculation of the power used in given operations, should together be able to make a fairly close estimate. The total horse power hours so estimated, at the ascertained cost per horse power hour, is then brought into the yearly expense of the crane, and this yearly expense of the crane is then apportioned between the machine tools served by the crane, and this is the item of crane service which enters into the hourly rate for the machine.

There are other items which properly enter into the annual expense of the individual machine tool. The general ledger account for the sundry supplies of a machine shop department should be carefully examined to ascertain which, if any, of these supplies are used for the operation of certain machines, and in as far as supplies are for the use of certain machines and not for the purely general use of the department, the expense of them should be brought into the machine rates and not left in the department general expenses. It is to be borne in mind that the more ex-

penses can be brought into the individual machine expense accounts, the more exact and the more simple the cost accounts will be.

The wages of a foreman whose supervision is restricted to a limited number of machines, and is not general to the department, are also most accurately distributed by including these wages in the expense of such machines, and ultimately in the hourly rate charged for their use.

It is also desirable to bring the expenses of tools whose use is restricted to certain machines into the annual expense and the hourly rate for such machines. This can be done where the tool department and its records are systematically organized.

The items therefore which possibly enter into the hourly rate chargeable for the use of a machine are the following:

1. Floor space.
2. Interest on investment in machine.
3. Repairs to machine.
4. Depreciation of machine.
5. Proportion of shafting, belting, and pulleys expense, consisting of interest on the investment, and repairs, and depreciation.
6. Crane service.
7. Supplies which are special to the machine.
8. Proportion of superintendence which is special to a limited number of machines.
9. The expense of interest, repairs, and depreciation on tools whose use is confined to the machine.

When the annual expense of each machine has been determined, it still remains to deduce the hourly rate, and this is rather far from being a mere arithmetical calculation.

In the first place it is necessary to divide the machines into at least two classes, and for most machine shops that have been in operation for some time, into three classes. The first class will consist of machines of full efficiency, whose use is general, and whose full capacity should under proper conditions be constantly used. The second class will consist of machines of full efficiency, installed for special and occasional use, and not upon a calculation of continuous operation. The third class is for machines which are not of the highest efficiency, but which are maintained and used when other machines which could do the work more economically are busy.

Concerning the first class the only question is what in a reasonable view of the matter constitutes full operation. Machines are sometimes idle for repairs, and under the best conditions time is occasionally lost from other causes. If 300 days in the year are multiplied by the working hours per day and then ten per cent. deducted, and the resulting number of hours adopted as the standard of full operation for the year, such a standard would seem reasonable and certainly not too high. If the working day is 9 hours, then $300 \times 9 = 2{,}700$ less $10\% = 2{,}430$, and the annual expense of the machine is divided by 2,430, and this gives the hourly rate.

Concerning machines in the second class, inquiry must be made as to the special uses for which they have been installed, and the extent of the use calculated upon and regarded as justifying the installation, and if for instance this was 50 per cent. of the full time, the number of hours into which the yearly expense is to be divided would under the conditions above suggested be 1,215 instead of 2,430. Such a calculation as this is subject to adjustment if it is found possible to utilize the machines more fully. If the use falls below the original calculation, the deficiency must probably be regarded as capacity idle which should be operated, and the cost of it charged to idle capacity account.

For machines in the third class, i. e., machines that have not a high efficiency, which in other words are semi-obsolete, but which it is occasionally convenient to use, the hourly rate should be determined exactly as for machines in the first class, i. e., the total annual expense divided by 2,430, and this for two reasons: 1st, their use is certainly worth no more than the hourly rate so determined, and probably even on this basis the work is expensively done; and 2d, the actual cost of keeping such machines in the shops cannot be too plainly shown.

The hourly rate for each machine in the shops having been arrived at, their use in cost accounts and general books is as simple as any familiar bookkeeping work, as simple for instance as to record and distribute the productive labor pay-roll. The two records of productive labor and machine time run at first together. The labor tickets which the machinists fill out for each job worked on, state the shop order number, and the operation, and the machinists' time, and the number of the machine tool, and all this information is transcribed on the workman's individual weekly

sheet which is necessarily prepared for the purposes of the pay-roll. Then there is a book called a machine rates ledger, containing an account for each machine tool in the shops, and from the workmen's weekly sheets there is posted to the accounts in the machine rates ledger every item of machine time, and these items are priced and extended at the hourly rate for the machine and are thence posted to the cost ledger accounts. The charges of machine time having been posted to the machine rates ledger for a given period, which it is convenient to make even weeks instead of the month inasmuch as the postings are made from weekly sheets, a statement is drawn off from this ledger showing all the machine numbers and against each the time charged in the period and the amount of the charges. On the statement the idle time is entered and extended at the machine rate per hour. The idle time for each machine is of course the difference between the time charged in the cost accounts for actual use of the machine, and for a four weeks' period, four fifty-second parts of the number of hours into which the machine expense for the year was divided.

The completed statement, except that we are not now considering the power charge which presently will be incorporated in the machine rates ledger and in this statement, is like this:

Machine No.	Time Charged	Amount.		Idle Time.	Amount.	

and the journal entry for the general books is made like this:

Manufacturing Account
Idle Capacity Account
To Machine Rates

the debit to manufacturing account being the machine time recorded on the workmen's tickets, and transcribed to their weekly sheets, and posted to machine rates ledger and cost ledger; and the debit to idle capacity account being the difference between the time so charged and the time calculated upon as full operation; and the credit to machine rates account being the full machine rates, or in other words, the full machine expense for the period.

Each account in the machine rates ledger is continuous and without entries for idle time, so that at any time a statement can be drawn off from the ledger showing the idle time of each machine from the beginning of the fiscal period to date and the cost of the idle time in each case, just as the monthly statement gives the same information for the month. The unused capacity of the shops is thus exactly stated, and its causes and the remedy can be investigated.

It may and doubtless will happen that machines are at times operated more than the hours calculated upon, and that consequently instead of debits there will in some periods and in respect of some machines be credits to the idle capacity account. Under these or any circumstances the plan laid down is to be followed, and as it is followed will be found to operate to further useful ends, and will not disclose any unsoundness.

Errata: Last month, page 353, line 5 from bottom, " in the case of a certain plant " should be " in the case of certain plant." Page 357, line 5 from top, " used, and " should be " used. And." Through a misunderstanding last month's article was not paragraphed as written. The paragraphing of the printed article may therefore be disregarded.

Some Aspects of the Bond Problem.

By Walter E. Hallett, C. P. A.

The recent interesting articles published in the July and August numbers of The Journal of Accountancy on the treatment of Bond Premiums and Discounts, help to elucidate many of the obscure points to the unskilled inquirer. It may be useful to seek further light on a subject that seems to many so very complex. Indeed, when one reads the many contradictions in the various court decisions cited, it seems almost impossible to refrain from the conclusion that the learned judges themselves have in some instances understood imperfectly the nature of the instrument whose peculiar characteristics formed the subject matter of the cases before them.

An analysis of the difficulties met with in the various cases will serve to point the way for a better understanding of the principles involved.

In order, therefore, to clarify the subject it were well to start with a definition of terms.

A bond is a promise to pay a certain principal sum at a certain definite time in the future, together with a promise to pay a certain other smaller sum, periodically, during the continuance of that time.

INCOME AND INTEREST.

Ordinarily we call these *principal* and *interest,* but it makes no difference what we call them. For the purpose of valuing a bond, we may better call it all principal, part being payable in installments, for in this way we shall avoid a very common error, that of confusing income on an investment with what is ordinarily called interest on a bond.

The price at which this investment, partly repayable in installments, sells is dependent upon a variety of conditions; partly upon the market rate for money, partly upon the security behind the loan, that is, the certainty of repayment, partly upon certain other adventitious things whose enumeration is not necessary to this article.

Let us assume, then, that we purchase a bond or undertaking, for a bond is nothing but an undertaking, to pay the principal sum of $1,000 at the end of five years, and another sum of $300 in half-yearly installments of $30 each. This is in common usage called a 5-year 6% bond for $1,000. We might assume a principal sum of any other amount, and installments of any other amount; the fact that the installments are called interest makes no difference, so far as the solution of the problem goes.

Let us assume that our investment is purchased at such a price that it produces an income of four per cent. (4%) per annum.

The value of the investment evidently consists of (a) the value of the principal sum, receivable five years hence, plus (b) the value of the installments, or an annuity of $60 for five years payable half-yearly. We find the present worth of $1,000, due in five years at 4% p. a. to be .....$ 820.35
and the present worth of annuity of $60, for a like term payable half-yearly to be..... 269.48

a total of $1,089.83

It is evident that our capital will be partly repaid in installments.

Let us follow the process.

At the end of the first six months we receive $30, part of which is interest on our investment, part repayment of capital.

Thus 2% on $1,089.83 or income is.....$21.79
The balance or repayment of capital is..... 8.21

$30.00

Our investment is now reduced to.....$1,081.62
2% of that sum is again..... 21.63
Remainder being a further repayment of..... 8.37

$30.00

Let us set down these successive operations in columns showing one income, capital repayment, and the standing of the capital sums:

Original investment $1,089.83

	Installments.	*Income.*	*Capital Repayments.*	
At end of 1st six months	$30.00	$21.79	$8.21	1,081.62
At end of 2d six months	30.00	21.63	8.37	1,073.25
At end of 3d six months	30.00	21.47	8.53	1,064.72
At end of 4th six months	30.00	21.29	8.71	1,056.01
At end of 5th six months	30.00	21.12	8.88	1,047.13
At end of 6th six months	30.00	20.94	9.06	1,038.07
At end of 7th six months	30.00	20.76	9.24	1,028.83
At end of 8th six months	30.00	20.57	9.43	1,019.40
At end of 9th six months	30.00	20.39	9.61	1,009.79
At end of 10th six months	30.00	20.21	9.79	1,000.00
	$300.00			
Principal sum now received			1,000.00	
Total repaid			$1,089.83	

Thus it will be seen that we have been repaid the entire sum of the original investment of $1,089.83 and have enjoyed in the meantime an income of 2% half yearly.

It is noticeable that the income gradually dwindles from $21.79 the first half-year to $20.21 the last half-year. This is clearly due to the fact that the investment becomes less each half-year by reason of the repayments of capital.

With these facts before us, certain things become clear: first, that the income from this investment consists of these sums of $21.79, $21.63, $21.47, etc., and that no process of reasoning can make it otherwise, for thus the conditions of the problem are fulfilled, and this points to the error in certain of the decisions above referred to, viz., that of confusing income from a bond investment with interest received from the coupons.

For the sake of further argument, let us suppose that the installments had been $200 each. On the same 4% basis our investment would then have been worth:

a. Present worth of principal..... $ 820.35
b. Present worth of installments..... 1,796.52

Total value $2,616.87

The division of the first installment of $200—between income and capital repayment—would then be:

Income	$ 52.33
Capital repayment	147.67
	$200.00

Probably no one, however unfamiliar with the subject, would here confuse "income" and "interest."

The cases cited by Mr. Angert, in his article on the "Proper Distribution of Interest on Bonds," where the court makes this error, are McLouth vs. Hunt, 154 N. Y., 179; in the matter of Hoyt, 160 N. Y. Rep., 607; Hemenway vs. Hemenway, 134 Mass., 446 (1883); Shaw vs. Cordis, 143 Mass., 443; Hite vs. Hite, 93 Ky., 257; Penn-Gaskells Estate (No. 2), 208 Pa. St., 346; Furners' Estate, 12 Phila., 130; Boyer vs. Chauncey, 12 Pa. Sup. Ct., 526. In certain of these cases the court has founded its decision on the *intent of the testator* as indicated in the wording of the will. Thus in the McLouth vs. Hunt case the court points to the evident intention of the testator that the life-tenants should receive the full interest on the bonds, because of his use of the words "full income," whereas Mr. Angert points out that these words were plainly used because, up to a certain age, the life tenants were to receive only "part income."

Says the court: "Whatever meaning the words full income in the will may convey to the mind of a trained expert in finance, it cannot, we think, be doubted that the common mind must always understand such a direction in a will as meaning the annual interest on securities."

"LOSS OF PREMIUM."

The extent to which faults of phraseology can lead to misconception of a subject is further illustrated by the very inaccurate phrase "loss of premium." We have seen by our illustration that there is no process in the valuing of a bond which can be fairly described as a "loss." The premium does disappear, it is true, but by repayment, not by loss; and the inference from the use of the term that a loss results has led the courts to seek grounds for placing the loss (in case of a life-estate) on one interest or the other.

Studying the rules of law as to the construction and interpretation of wills, rather than the nature of the instruments, the

courts have often favored one interest to the great detriment of the other, whereas it might seem to be their duty to preserve the equities of the parties.

In the Shaw vs. Cordis case, 143 Mass., 443, the court says: "A fair construction of the will leads us to the conclusion that the testator intended that the *whole income* should be paid to his sons without any deduction to make good to the remainderman the premiums." Further, that the testator, in limiting the trustee to investments in three kinds of bonds, indicated a willingness to have the *principal impaired* by such investments; and, in the absence of any expression of desire that it should be held intact, the *full income* should be paid the life-tenant. An excellent illustration of the "loss of premium" error, and the "income and interest" error.

MARKET FLUCTUATIONS.

In the case of Hemenway vs. Hemenway the court says, in another place: "In order to estimate how much of a given premium is paid from the difference between the interest of the bond and that which the life tenant ought to receive, we have to establish a rate for the latter as our starting point. This would naturally be the market rate if that were ascertainable. But there would be no justice in stopping at the rate when the bond was bought merely. If theoretical accuracy were possible, the tenant should receive the current rate of interest at any moment. But the current rate of interest is continually varying from day to day, and from month to month, apart from the greater variation to be found in taking a series of years. These variations above would make actual calculations impossible, but they are a strong objection to establishing a constant rate for the interest of the tenant for life."

And in the McLouth vs. Hunt case: "They (bonds) may be purchased at a premium and sold at a still higher one, in which case, if there is a deduction made from the interest and added to the principal to balance the premium, the remainderman would be doubly benefited. Some investments will increase, while others will diminish, in value. When all these things are considered, the better rule, it is urged, is to allow these matters to balance themselves, as, on the whole, they are quite likely to do in the end."

In these opinions the learned judges again confuse two distinct things. An examination of the schedule of the bond taken as our example shows its orderly and regular approach toward maturity. The value moves with mathematical accuracy. The steps by which this approach is made, namely, $8.21, $8.37, $8.53, $8.71, etc., lengthen uniformly. The acceleration is caused, of course, by the operation of compound interest. Were the process carried out with theoretical accuracy we should have had, instead of this series of steps or jerks, a regular curve, just as the perimeter of a polygon with an infinite number of sides becomes a circle.

The decisions quoted confuse this orderly process with the uncertain and variable fluctuations of the market. They have no relation to each other whatever. The one is the process of the repayment of invested capital at a given rate; the other contains the elements of profit and loss from which the realization of no asset is free. Indeed, few assets are as free from this purely profit and loss feature as bonds.

THE DISCOUNT FALLACY.

Mr. May, in his article in the July JOURNAL, found a stumbling block in the matter of discounts, as has been very ably pointed out by Mr. Chas. E. Sprague in his letter on "Premiums and Discounts."

The word "discount" is an unfortunate one. It carries with it a suggestion of something discreditable. Perhaps the notion is connected with the very unscientific custom of commercial discounting. "Interest" is figured on money invested. "Discount," however, is figured, not on the money invested, but upon that sum plus the discount itself. Thus the banker gets a double profit. The public has a vague notion that it is being "done," hence the prejudice.

The term *discount,* as the antithesis of *premium,* in the case of a bond, starts out with a handicap. It would be fortunate if we had another word. "Variation from par," above or below, might be used as a descriptive phrase for either premium or discount, for they are the same. A discount is merely a negative quantity whose positive is a premium. At least it should start out with nothing to its discredit.

But the confusion as to discounts proceeds from a seemingly more real cause.

Let us suppose a case from the same point of view as before.

A $1,000 bond due in 5 years, installments of $15 each half-year, purchased to produce 4% per annum.

We value it exactly as before:

(a) Present worth of principal.....$820.35
(a) Present worth of installments.....$134.74

Total value $955.09

Our first installment is $15, but 2% on $955.09 is $19.10. Here seems to some a difficulty. In the case of a life-estate, how is a trustee to pay as income more to the life-tenant than he actually receives from the bond? Let us answer this question by asking another. Does a merchant figure his profits on sales, or does he wait until the proceeds are actually in hand? Or, if a trustee held as part of a life estate a mercantile business, would he pay over to the life tenant the income based on sales, or would it be his duty to wait until the sales were realized before estimating profits? One does not hesitate long for an answer. Or we may put the same thing in another way.

Let us conceive a bond payable without installments, the principal sum of $1,000, due in five years, at 4%. At what price should it be bought to realize the required 4%. Evidently this is quantity *a* in our assumed cases, viz., $820.35.

INSURANCE AN ELEMENT OF ALL PREMIUMS AND DISCOUNTS.

In the Hemenway case the court found another difficulty as to replacing the funds invested in premiums. It argued that in order to make the "loss in the investment" due to the wasting away of premiums fall upon the life-tenant it must be assumed that the premium is paid only on account of a higher rate of interest, but as a matter of fact, a premium on bonds is paid largely for safety of the capital invested, and the safety of the capital is a matter that interests the remainderman more than the life-tenant.

If this argument is sound, then, in case real estate formed part of the estate in the hands of the trustee, insurance on the buildings should be paid by the remainderman, to prevent an

impaired estate being turned over to him. This is certainly new doctrine.

Mr. May found this same difficulty, but only in the matter of discounts; probably conceiving the idea of a discount as implying insecurity.

As a matter of fact, however, the difference between "income" and "interest," which always is a measure of the amount of premium or discount, contains in every case, as has been said, an element of insurance against risk. The market rate of money and insurance against risk are the two principal things which determine at how much variation from par a bond shall sell.

The Administrative Organization of the American Smelting and Refining Company.

By A. W. Wright.

The management of the American Smelting and Refining Company is in the hands of the executive committee. This committee comprises eleven out of the twenty-one directors, including the president of the company. During the intervals between the meetings of the board of directors, all the powers vested in them are exercised by the executive committee.

The principal business of the company is the purchase of gold, silver, lead and copper in ores, their reduction to metallic form by the smelting process, and the sale of the refined metals. It has plants in Washington, California, Utah, Montana, Colorado, Texas, Nebraska, Illinois and New Jersey, and the States of Nuevo Leon, Durango and Aguas Calientes in Mexico, besides mines and ore purchasing and other agencies in many other places. The plants are under the control of managers, whose direct responsibility is to the executive committee. The more isolated plants claim the entire attention of their managers, while those forming natural groups, either territorial or circumstantial, are controlled by the manager of the group. Thus, the Colorado plants are grouped in the Colorado department, the Denver office being the headquarters of the manager. Each plant has its superintendent, who reports to the manager. The plants in Mexico, together with the plant at El Paso, Texas, which smelts largely American ores, are grouped in the Southern department. This division is quite appropriate on account of the differences between our own and the Mexican languages, laws, and systems of weights, measures and money. Separate comparisons are desirable between plants operating under Mexican conditions. The Southern department has a manager and an assistant manager, who are followed in authority by both a manager and a superintendent at each of the plants. The manager of a plant or group of plants has control also of the tributary ore buying and other agencies or operations.

Corresponding to the three grand divisions named above of the company's business are the three departments of purchasing, operating and selling. The first of these, now spoken of, attends

to the purchase of ores, the supply purchasing department being entirely distinct. Qualifications for ore buying involve a knowledge of ores, the chemical elements in them detrimental and advantageous to the processes of treatment, the costs of smelting and of roasting and other preliminary processes, and of the composition of smelting mixtures and transportation conditions. Ore purchasing agents are maintained in Denver and at many of the plants, and are under the authority of the managers. They have representatives in many of the mining districts or at the shipping points.

Between the purchasing of the ores and the selling of the metals there lies the broad field of the operating department. In the beginning there was a committee, so named, composed largely of the technical experts of the company, whose province was the determining of questions relating to metallurgical operations, improvements in plants and processes, and like matters. This committee has since been abolished, its various concerns now being supervised by other departments or by the executive committee.

The supply purchasing department has headquarters in New York. Purchases are made upon proper requisitions from the plants. Large purchases are, of course, made from the Denver office and by the managers locally. But all such are reported to the head of the department in New York. The purchasing agent has an assistant in New York and one in Denver. A bureau in this department is devoted to the purchase of the large quantities of fuel required by the Mexican plants, and, by the singular survival of a custom of one of the consolidated companies, of the transportation of this fuel. This is accomplished by means of a line of steamers running between New York and Tampico, Mexico, and carrying bullion on their return trips. They are operated by a subsidiary company, organized for the purpose. The purchasing department acts for the smelting company's allied and subsidiary corporations.

The engineering department includes the engineers and draftsmen in the New York and Denver offices and at the various plants. It is in charge of a chief engineer, who makes extended trips of inspection, investigation and supervision. The field of the department comprises the preparation of plans and specifications for improvements and new construction, existing buildings, and the

increase of the efficiency of power plants and mechanical installations generally.

The traffic department is located in the New York office. Its personnel consists of the traffic manager, the assistant traffic manager, chief clerk, and the necessary force of clerks. A representative of the department is stationed in Denver. In other parts of the field the traffic manager is represented by the managers except in Mexico City, where considerable Mexican business passes through the agency maintained there. The department covers the usual field of traffic matters, such as negotiations pertaining to rates, the routeing of shipments and the collection of claims. Detailed claim records are kept, corresponding to accounts on the comptroller's books. The shipments supervised by this department aggregate about twenty thousand tons daily. The stock transfer department is under the supervision of the secretary.

The accounting department is in charge of the comptroller, who is assisted by the auditor. The auditor has charge of the computations and comparisons of costs, and of metallurgical and miscellaneous statistics. The preparation of balance sheets and the handling of all financial accounts are in the hands of the comptroller. At the plants the managers are in charge of the accounts, assisted by chief clerks. In the Colorado department the plants are near enough together to permit the concentration of the office work in the Denver office. The plants of the Southern department are so far apart that a similar concentration is injudicious.

The Mining department is described by its name. The company owns comparatively few mines directly, though its mining interests through allied and subsidiary companies are extensive. The mines owned are grouped in the mining department, and are operated under a manager who makes periodical visits to them. Ores produced are sold to the plants as if mined by outsiders, so that mining department profits are accounted for separately.

An ore purchasing agency is maintained in Antofagasta, Chili. The agent supplies himself with funds through London and Valparaiso, and ships his purchases around Cape Horn to Galveston, Texas, or to Perth Amboy, New Jersey. A European agency is located in London, principally for the sale of silver.

In the City of Mexico there is a financial and general agency. Funds for all Mexican operations are provided by the financial agents through the sale of drafts on New York. The ranking

financial agent is also the general representative of the company in its numerous relations with the Mexican government.

Such are the departments of the company's activities, and such its administrative organization, briefly described. The channels of authority run from the executive committee to the plant or district managers, either direct or roundabout, through the headquarters departments. The managers are thus the representatives of all departments. A business so scattered and extensive is not organized in a day, and it would be folly to suppose that it has reached perfection. Faults the organization doubtless has, but the enterprise and ability of the men composing it may be trusted to bring about their ultimate correction. The wonder is not that there are faults still uncorrected, but that the administrative organization is as good as it is, and that the company's vast business is so efficiently handled.*

* The author of this article was formerly traveling auditor for the company.

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EDITORS

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EDITORIAL.

The Real Estate Trust Failure and the Duty of Bank Directors.

In the failure of the Real Estate Trust Company of Philadelphia, bank and trust company directors of the United States have had a most impressive and, we hope, an instructive object lesson. Here was a company regarded as perhaps the second strongest trust company in Philadelphia, whose officials stood at the very top among the men of their calling, whose directors were men of wealth and proven sagacity; an institution of which business Philadelphia was justly proud, yet the Real Estate Trust Company was looted by its president, with the connivance of two subordinate officials, of nearly $7,000,000 of money, apparently under the very eyes of the directors, and without the knowledge, so far as can be ascertained, of any of them.

These directors have agreed to contribute $2,500,000 toward the rehabilitation of the company; in addition they are heavy losers from the depreciation in the value of their stock, and from the sacrifice of a large part of their own deposits. Some of this loss they may recover, but only after years have elapsed. They have paid this heavy price as the penalty for their neglect of the most simple and obvious precautions to safeguard their institution against the traitors within its walls.

The Real Estate Trust Company was supposed to be subject to the State Banking Department, but the state inspectors had not visited its offices in two years, presumably because of the unlimited confidence of the bank examiners in the company's

strength and solvency. The company had as its sole protection against the dishonesty of its officials, its private auditor, a man who had long outlived his usefulness.

This auditor was completely dominated by the president, prepared only such reports and statements as the president requested and offered his certificate as desired. His report was transmitted to the board, through the president, and never reached its destination.

The abstraction of the funds of the Trust Company was accomplished by large loans to companies promoted and controlled by Mr. Adolph Segal, secured by the unmarketable stocks and bonds of these companies. The president, th. late Mr. Frank K. Hipple, presented a false list of loans, supposedly secured by gilt-edged collateral, to the board for their approval, keeping from them all knowledge of the actual facts.

Here then was the situation: The state bank examiner was negligent, the company's auditor was a tool of the president, the stockholders and depositors trusted the directors, the directors trusted the president implicitly and the president was a rogue.

What protection, under the present system of bank and trust company examinations, has any board of directors against a similar catastrophe? It may be urged that it is the duty of directors to examine closely into the details of the business of any institution with which they are connected, and that if they faithfully discharge their duty they are in no danger of being compelled to pay the penalties of carelessness and neglect. In theory this may be correct—in practice, however, it is impossible. A prominent financier, a director in a number of banks, presented the case very clearly and simply as follows: "The directors of a bank must be drawn from the ranks of active business men. Bank directors have their private concerns to look after, and they cannot devote the amount of time which would be necessary to familiarize themselves with the management of the various institutions on whose boards they sit. In former times, the directors of a bank would meet twice a week. Anyone who had a note to be discounted would drop it in the discount box, and on the discount day, all these notes would be laid before the board, and each one would be passed upon. Nothing would be done between board meetings. In the large banks to-day, with the development of the collateral call loan business, the conduct

of business is entirely different. The demand for loans is continuous, the directors cannot be in continual session, and consequently much authority must be given to the officials. It is true that the action of the officials should be reported to the board, but this report consists merely in reading off the list of loans which have been made. The president gives to the directors a list of discounts and loans amounting to several million dollars, and a director must be very alert to catch any item which does not suit him. The president of a large insurance company was recently discussing this matter with me. He said, 'I had a director. He was a new man. He said to me the other day, "You read off a lot of things which you have done, and how do we know that all of these matters are correct?" I replied, "You don't know." The director insisted upon having exact information, and I said to him: "This statement is made up of the month's business by such and such a clerk. I will introduce you to the clerk. That clerk has taken it from the books, and it took four or five hours to make it up. Now you can go through the books with him and check it off. After it has been checked off the books you can check it off the vouchers, and if you are then not satisfied with the report, you will be at least satisfied that you will not wish to go through this work again. Suppose the director of a bank or trust company says to the cashier, 'How much collateral loans have you?' The cashier says, 'I have about $12,000,000.' 'Well,' says the director, 'I should like to look over them.' These notes and collateral would cover a large table, and might require a week of the director's time to examine. About all he could do would be to make a casual selection, and even this method is not always adopted."'"

It is not the business of the directors to perform this work of auditing. They have not the time, neither have they the training. They should not be blamed because they do not audit the accounts. Are directors then to be exonerated from all responsibility? By no means. It is the duty of every board to provide that accurate and detailed information concerning the conduct of the business intrusted to its care is periodically furnished them. Then they should employ a public accountant for this purpose. The public accountant is disinterested; he is competent and he is thorough. Any board is open to criticism which does not satisfy itself, through the independent examination of

a public accountant, that the reports and statements submitted to them by their officials are in every way correct. The examination of a political appointee is not sufficient, and indeed furnishes few safeguards. When we consider that the most disgraceful failures among national banks have closely followed the periodical audits by the bank examiners, and couple this with the repeated denunciations of the entire system of national bank examinations by comptrollers of the currency and secretaries of the treasury, we can realize that the directors of a large national bank who rely upon official audits to protect their institutions from the possible consequences of their neglect, are leaning upon broken reeds. As for the state banks and trust companies, it is not too much to say that they are not examined at all, and that unless they employ the services of a public accountant, they are largely at the mercy of their officials. We do not mean to imply that there is any likelihood that the experience of the Real Estate Trust Company, of Philadelphia, or the Milwaukee Avenue State Bank, of Chicago, or the First National Bank of Chelsea, or the Enterprise National Bank, of Pittsburg, will be repeated on any large scale. The vast majority of bank officials are honest. Periodical audits would not make them more honest. A minority of bank officials are, however, either dishonest or criminally reckless in the management. It is against these that directors, stockholders and depositors need protection. Up to the time of his death, no man stood higher in the confidence of Philadelphia than the late president of the Real Estate Trust Company. Indeed, it is usually the unlimited confidence of his business associates that enables the large bank robber to make away with his loot. The directors, if they are to faithfully manage their business, should not rely upon the unsupported word of any official, no matter how great their confidence may be in his integrity. These statements should in all cases be supported by the certificate of a public accountant, given as a result of regular examinations, extending into every detail of the bank or trust company's affairs. With periodical examinations by competent accountants, who report directly to the board of directors, it is impossible that any institution should be put into jeopardy without the knowledge of the board. In the absence of such an examination, there is no bank director in the United States who is free from the danger of being compelled, by the power of public opinion or

by the fear of legal proceedings, to restore to the depositors the money which he has allowed some pious fraud of a president or cashier to despoil them of.

The Reports of American Corporations.

Hereafter THE JOURNAL OF ACCOUNTANCY will contain a department devoted to a critical review of the reports of American Corporations whose stocks and bonds are of such character as cause them to be regularly dealt in on the Investment Market. Approaching a subject so delicate, the point of view of the editors will be: "What is the investor entitled to know?" The investor is the proprietor of the corporation, or of the assets in which the corporation holds equities.

The purpose of reports is to furnish accurate and authoritative information necessary to the exercise of intelligent investment control. Under the provisions of the Company's Acts of Great Britain the accuracy of such information is guaranteed by requiring that the stockholders at the regular meeting shall elect an independent auditor, who is held criminally and civilly responsible for statements made. Under the British system the auditor reports to the stockholders—this is the answer given by Parliament to the demand for publicity, and as a result it may be said that for the last half century Britain has been more free from corporate scandal than any of the strong commercial nations.

Following *laissez faire* doctrine, the United States has recognized no duty of corporate proprietorship and has provided no method for giving to investors adequate information in order that their judgments with respect to trusted agents may be an intelligent one. The officers having been placed in charge of the corporate estate and management have been permitted to render such an account and report of their stewardship as they may deem fit. Demands for publicity have not proceeded from investors, nor has it looked toward intelligent judgment of efficiency and economy of management. It has proceeded from a public conscience which is shocked by corporate immorality. Publicity is asked for in order that the State may exercise the proper police control. Our sense of business immorality and

justice would be protected. If, however, we are to have corporate control which looks toward efficiency and economy the intelligence necessary to such control must come to the administration through the accounts, and must be regularly produced to the investor in the form of authoritative reports. While critical in our analysis, the aim and purpose of the department will be educational, looking toward a constructive result.

The American Association and Accountancy Ethics.

The third annual convention of the American Association of Public Accountants which convenes at Columbus, Ohio, on October 22d, promises to be of unusual interest. In addition to a number of interesting papers and addresses, the sessions will be largely devoted to a discussion of three subjects of great professional interest: the question of advertising, of audit companies, and of fees. Presumably, the outcome of the debate will be a set of formal resolutions which will define the position of the association upon these points of professional ethics.

It is difficult to forecast the result of such a discussion. No doubt there will be many accountants who will favor the recognition of audit companies, the standardization of fees, and the approval of advertising, otherwise there would be no debate. THE JOURNAL OF ACCOUNTANCY, however, stands with what we believe is the majority of the profession, opposing institutions, practices and regulations whose influence is to degrade accountancy to the level of a commercial enterprise, to destroy or greatly impair relations of professional confidence, and to establish what closely resembles a trade union rate of wages. We are opposed to the recognition of audit companies, to the exploitation of accountancy by advertising and to the standardization of professional charges. The standing of the profession will be weakened, in our judgment, if the American Association shall take an affirmative position upon any of these questions.

Reviews of Corporation Reports.

Corporate control is of three kinds, viz.: (1) the control exercised by the stockholder, (2) the control exercised by the board, (3) the control exercised by the officer. The purpose of accounts and reports is to make control intelligent. Do the reports rendered to stockholders contain such information as will enable them to exercise intelligent judgment with respect to the fidelity, efficiency and economy of corporate trustees and agents? This is the viewpoint of criticism and analysis appearing in this department of THE JOURNAL.

The Chicago and Northwestern Report.

A. is a stockholder of the Chicago and Northwestern Railway Company. Being desirous of voting intelligently at the annual election of the Board of Directors, he picks up a copy of the company's annual report for the fiscal year ending June 30, 1906, and seeks information which will throw light on the character and efficiency of the management during the past year. Will he find in this report all the information which is necessary for this purpose?

The printed report consists of two parts, one a descriptive report signed by the president of the company, the other a section of "Accounts and Statistics" containing the balance sheet, income account, physical statistics and various comparative statements compiled by or from the accounting department. The latter section should contain in statistical form all the information that is necessary for the stockholders to have to form an intelligent judgment as to the character and efficiency of the management, and the financial results; the section devoted to the president's report should merely present this information in more popular form. An examination of the report, however, reveals not only the fact that much of the statistical matter that ought to be presented in the statistical section is presented in the president's report instead, but that the matter which is contained in both sections is not presented in the form most conducive to bringing out the information desired.

For instance, the statistics of train movements, passengers and freight carried, average train-load, charges, quantity of ties and rails replaced, bridges rebuilt, and track reballasted are

found only in the president's report. There are no statistics of engine-, passenger car- and freight car-mileage, nor, with the exception of the last item, can they be ascertained by computation; yet this information is necessary for a judgment as to the efficiency of train management.

Neither the president's report nor the statistical section is addressed to anyone in particular, nor is the latter signed. The last is especially important. If the balance sheet, income account, and statistical tables were compiled by an independent accountant after a careful audit, they might be very valuable to the stockholder or director who is seeking information in them, which would enable him to vote or act intelligently. But if they were compiled by the accounting department of the company itself their value would be much lessened for various reasons; the source is not disinterested, the information may be incomplete or presented in a form calculated to conceal the desirable information and to mislead. This criticism may be aimed at the reports of many other railway companies also. The importance of an independent audit of railway accounts cannot be over-emphasized. The stockholders will receive information which is information only when they insist on having the accounts of their companies audited and certified by reputable and independent accounting firms, who shall make their reports to the stockholders themselves and not to the officials of the company. The statistical section of the Northwestern's report probably has been compiled by the company's accounting department.

Assuming that these statistics are correct, what information can be obtained from them? Holding stock as an investment, A. is interested in the Northwestern's earning capacity and turns to the Income Account. This is what he finds: (See Table 1.)

This statement shows neither the net earnings for the year, nor the net income after payment of fixed charges applicable to the payment of dividends, these being merged with a stated profit and loss surplus, under the name of "Balance of Income Account," brought forward from previous years, an item which may represent a real surplus or nothing. These items could be

Table 1.

Income Account, June 30, 1906.
(7,428.77 Miles.)

June 30, 1906: To Operating Expenses		$39,789,099.17	June 30, 1905: By balance of income acc't June 30, 1905,		$11,640,181.01
To Taxes		2,427,176.68	June 30, 1906: By Gross Earnings, viz.: Passenger Earnings	$14,441,415 07	
To Interest on bonds and interest	$7,845,329.34		Freight Earnings	45,802,852.58	
Less Dividends rec'd on C., St. P. M. & O. Stock	1,029,000.000	6,816,329.34	Express, Mail and Misc	3,237,310.33	63,481,577.98
To Sinking Fund Accts. (itemized)		225,500.00	By Other Income		577,080.09
To Dividends on Stock (itemized)		6,483,913.50			
To Amt. of Expenditures for Construction, etc, deducted from Surplus net income by authority of Board of Directors		6,000,000			
To Balance of Income Account		13,956,820.30			$75,698,838.99
		$75,698,838 99	By Bal. to Credit of Income Acc't		$13,956 820.30

made to stand out clearly as in the following rearranged account:

Income Account, June 30, 1906.

To Operating Expenses		$39,789,099.17	By Gross Earnings, viz.: Passenger Earnings	$14,441.415.07	
To Balance, Net Earnings for year per contra		23,692,478.81	Freight Earnings.	45,802,852.08	
		$63,481,577.81	Express, Mail & Miscellaneous	3,237,310 33	
					$63,481,577.98
To Fixed Charges, Taxes		$2,427,176.68			$63.481,577.98
Interest on Bonds	7,845,329.34		By Balance, per contra		$23,692,478.81
Less Dividends on C., St. P., M & O. Stock	1,029,000.00		Other Income		577,080.00
	$7,816,329 34				
To Sinking Funds	225,500.00				
		$9,469,006.02			
To Balance, net income, per contra		14,800,552.79			
		$24.269.558.81			$24.269.558.81
Dividends (itemized		$6,483,913.50	By Balance, Net Income Available for Dividends, per contra		$14,800,552.79
Expenditures for Construction, Improvements, etc., deducted from Surplus Income by authority of the Board or Directors		6,000,000.40			
					$14,800,552.79
Balance, Surplus, net Income for year		2,316,639.29	By Balance, etc.		$2,316,639.29
		$14,800,552.79	By Surplus Income, June 30, 1905		11,640,181.01

From this statement it appears that the net earnings from operation for the year were $23,692,478.81, which together with other income and after the deduction of fixed charges left $14,800,552.79 available for distribution in dividends. The 8 per cent. dividends on preferred and 7 per cent. on common stock used up less than 44 per cent. of this, leaving $8,316,639.29, which might have been carried to the surplus account. Six millions of this was written off, however, to cover the cost of new construction and improvement.

On its face this is a very good showing and justifies the high market price of Northwestern stock. A. seeks to verify this result by seeing whether sufficient allowances have been made for maintenance of way and equipment. As items in a subsequent table he finds:

Renewals of rails	$ 398,565.52
Renewals of ties	858,528.22
Repairs of roadway and track	3,703,983.66
Total maintenance of way	6,864,897.78
Repairs of locomotives	3,140,532.15
Repairs of passenger cars	564,559.63
Repairs of freight cars	4,592,976.80
Total maintenance of equipment	9,032,135.43

The cost of "maintenance of way" was nearly $6,900,000, and of "maintenance of equipment" over $9,000,000. Were these adequate? Were they insufficient, meaning ultimate impairment of the earning capacity of the property? Were they excessive, leading to a concealed surplus, which, because it is secret, leaves the market price of Northwestern stock lower than it otherwise would be, thus allowing "insiders" an opportunity to profit at the expense of the stockholder by speculating on the future advances of the stock?

The following statements may assist in answering these questions:

Aver. (estimated) number of locomotives in use during year	1,325
Aver. (estimated) number of passenger cars in use during year	1,165
Aver. (estimated) number of freight cars in use during year	54,074
Average number of miles of track operated	7,428.27
Tons of freight carried one mile	5,156,074,115
Aver. number tons of revenue freight per loaded car per mile	14.46
Total mileage of freight trains	19,634,933
Total mileage of passenger trains	15,797,903
New steel rails laid in renewals, in tons	22,889
Usable steel rails laid in renewals, in tons	6,294
Cost of new steel rails	$641,475.34
Cost of usable steel rails	$130,386.25

Value of old rails and other items	$463,296.07
Miles of track relaid with rails	256.96
No. of ties laid in renewals	1,964,045
Miles of track ballasted with crushed stone	9.00
Miles " " " " gravel	505.23
Miles " " " " cinders and slag	80.63
No. of steel bridges replacing wooden structures	63
Length of steel bridges, in feet	2,947
Tons of bridge metal contained in steel bridges	2,618
Length of wooden structures filled in, in feet	9,296

Only the data as to equipment are obtainable from the "Accounts and Statistics" section; much of the remainder must be dug from the context of the president's report. Now to make use of these data.

Comparing the item, tons of freight carried one mile, with the item, average number of tons of revenue freight per loaded car per mile, it is seen that the total loaded car mileage for the year was 356,574,974 miles, which, for the average of 57,074 cars in service, amounts to 18.07 miles per day per loaded car. There is no means of ascertaining the empty car mileage; the Northwestern's report is deficient in this respect. But if a sufficient empty car mileage be assumed to bring the average run per car per day up to 30 miles, which is only average speed, this would bring the total car mileage for the year up to 592,037,503 miles. Probably this is far in excess of the actual mileage, but if not, the stated cost of repairs to freight cars, $4,592,976.80, represents a cost of about 7.7 mills per car mile; Woodlock allows 5 to 6 mills as sufficient for keeping freight equipment intact and in good condition. This sum also amounts to about $85 per year per car, as compared with $40 allowed as probably sufficient by the late Thomas L. Greene. It would seem that the freight cars which the Northwestern has bought to replace the cars sent to the bone-yard have been larger and more costly cars.

The report is again deficient. Although the passenger train mileage is stated, there are no data to enable one to ascertain the passenger car mileage and thus estimate the cost in repairs and renewals per passenger car mile. Nor is the helping and switching engine mileage stated, so that the inquiring stockholder understands the cost per engine mile of repairs and replacements of locomotives. By comparing the total cost of repairs to locomotives, $3,140,532.15, with the average number of locomotives. 1,325, he observes that the average cost per locomotive for the

year was $2,370.21; in the present age of heavy and costly locomotives, this probably is not very excessive. In a similar manner the repairs to passenger cars cost $493 per car, which is about the average. The equipment has been more than maintained in condition and capacity.

Turning attention to maintenance of way statistics, the new steel rails, at the stated total value, cost about $28 per ton, Steel Trust values; the "usable" steel rails cost nearly $21 per ton, which seems high. The total of 29,183 tons of rails relaid in 256.96 miles of track shows an average weight of the rails of only 64½ lbs. per yard, which seems light in comparison with the 90 and 120 lb. rails being laid in the main track of other railroads; probably the new steel rails laid in the main line were about 70 lbs. per yard, the average being brought down by the much lighter "usable" rails which were laid in the tracks of branch lines. The report should explicitly state the weight of rails used in the main and branch lines.

The 256.96 miles of track relaid with rails constitute only about one twenty-ninth of the total average mileage in operation. In this age of the rapid replacement of medium by heavy rails, the proportion should be at least double this. The 1,964,045 ties laid in renewals average 264 ties per mile of road operated. Allowing 2800 ties per mile of road, and seven years as the average length of life of a tie, the number relaid each year should be about 400. Probably ties last much longer in the arid regions in which a part of the Northwestern's lines lie, but the number 264 seems small. At a total cost of $858,528, these ties averaged 43.7 cents each, which is probably not excessive.

The total cost for maintenance of way and structures, $6,864,898, allows only an average of $925 per mile, which is certainly not more than is necessary to keep the property in good physical condition. On many roads this allowance exceeds $2,000 per mile.

From the available physical statistics the inquiring stockholder judges that the fixed property has just about been maintained, while the rolling stock has been somewhat improved, the cost being charged to operating expenses. Revising his judgment by taking into account the $6,000,000 expended in "construction, improvements, and new permanent structures" and

charged against "Surplus Income," he decides that, if this item represents anything tangible, the property has been more than adequately maintained. This will be taken up later in connection with the Balance Sheet and "Construction Account."

Stockholder A. notes that the equipment has been increased during the year by the purchase of 35 new locomotives, 50 passenger cars and 3,586 freight and work cars. He desires to investigate the efficiency of train and car management and to see whether this additional equipment was really needed. For this purpose he brings together the following statistics, part of which has been stated or computed above:

Aver. number of tons of revenue freight per train per mile...		262.60
Aver. number of revenue freight per loaded car per mile.....		14.46
Aver. rate per ton per mile, in cents.....		0.89
Aver. earnings per freight train mile.....		$2.34
Passenger train mileage		15,797,903
Passengers carried one mile		703,176,138
Aver. number of passengers per train per mile.....		44.51
Aver. rate per passenger per mile, in cents.....		2.05
Aver. earnings per passenger train mile.....		$1.10
Aver. number of miles traveled by each loaded car per day...		18.07
Cost of motive power per train mile:		
Repairs to engines	$0.059	
Fuel	0.151	
Engineers and firemen	0.101	
Oil and waste	0.005	$0.316
Increase in tons of freight carried, per cent.....		14.97
Increase in tons of freight carried one mile, per cent.....		20.12

The last four items, which are computed, should be shown for the engine mile; but in the absence of statistics of helping and switching engine mileage it is impossible to do this. The average train load of 263 tons is light for the territory through which the Northwestern runs; it should be considerably over 300 tons. The two items of $2.34 earnings per freight train-mile and $1.10 per passenger train-mile are about the average, as also are the rates of 8.9 mills per ton-mile and 2.05 cents per passenger-mile. The average carload for both loaded and empty car mileage should be about 15 tons; the stated figure of 14.46 tons per loaded car mile seems small; it may indicate that the freight equipment consists mostly of cars of comparatively small capacity. The average capacity per car, and the number of cars of each capacity should be stated in the equipment statistics.

The average number of passengers per passenger train-mile is obtained by comparing "Passengers carried one mile" by "Passenger train mileage"; the result, 44.51, is the average for that section of the country. Since the passenger car mileage and therefore the average number of cars per train are not known, there is no way of judging the need of the 50 new passenger and baggage cars purchased except by noting the growth of the passenger traffic. Passenger train mileage increased 5.77 per cent., passenger mileage 6.33 per cent. and the number of passengers 6.79 per cent. The passenger equipment was increased less than 5 per cent. Both the average freight car load and the average freight train load increased 9 and 10 per cent. in spite of the increase of nearly 7 per cent. in the number of freight cars; the tons of freight carried having increased nearly 15 per cent., and ton-mileage over 20 per cent.

On the whole, probably the new equipment was needed, although this could be judged better if data were at hand to show the average number of passengers per car mile, the average capacity of the freight equipment, and the average number of miles per day traveled by freight cars, loaded and empty. The last item is needed to show the efficiency of car management, whether they are loaded and emptied rapidly and kept moving, or let stand on private spurs and sidings. Neither the efficiency of freight, nor of passenger car management can be ascertained.

Turning to the balance sheet the stockholder finds a statement which tells him very little. It is a combination of the balance sheets of all the companies in the Northwestern system, whose lines are owned by the Chicago & Northwestern Railway Company, either directly or indirectly through ownership of the stock of proprietary companies. Neither the balance sheets nor the income accounts of these proprietary companies individually are shown, although the stockholder would be interested in the right management and successful operation of each. The main headings of this condensed balance sheet are shown in Table 3, next page.

As a technical matter the accountant might criticise the practice of exhibiting a sinking fund or an equipment renewal fund as a liability. It is seen that the "Operating Assets" exceed the "Current Liabilities" and the "Income Balances" combined, which is as it should be.

Table 3.

CONDENSED GENERAL BALANCE SHEETS, JUNE 30, 1906.

Dr.		
Cost of Property		
Balance June 30, 1905	$224,443,271.76	
Construction and equipment expenditures for year	3,311,024.67	
		$227,754,296.43
Trustees of sinking funds		8,980,839.54
General Assets (Itemizing Securities of C. & N. W. Ry. Co., subsidiary and other companies owned		37,393,831.77
Operating Assets (Materials, Bills Receivable, Cash, etc.)		23,801,326.15
		$297,990,293.89

CONDENSED GENERAL BALANCE SHEETS, JUNE 30, 1906.

		Cr.
Capital Stock		
Common stock	$97,577,862.92	
Preferred stock	2,337,837.61	
		$99,915,700.53
Funded debt		164,214,000.00
Sinking funds paid		8,980,839.54
Equipment renewal fund		1,148,681.39
Current liabilities		9,531,401.24
Income balances		
Railroad income acc't	$13,956,820.30	
Land income acc't	242,850.89	14,199,671.19
		$297,990,293.89

Other than this, this balance sheet yields practically no information. It would not have been difficult to print a comparative balance sheet, showing the amounts of the various items for two and possibly a longer period of years. Such a balance sheet would have been valuable to the stockholder by enabling him to trace the changes in these items from one year to another. By comparing the balance sheet for 1906 with that of 1905, and tabulating the changes, the following schedules are obtained:

PURPOSES FOR WHICH EXPENDITURES WERE MADE.

Increase in certain assets:	
Cost of property	$3,311,024.67
Trustees of sinking funds	449,897.50
General Assets:	
C. & N. W. bonds on hand	4,880,000.00
Sundry bonds fundable for C. & N. W. B'ds	131,000.00
Cost of securities and advances on acc't of sundry proprietary companies	5,774,545.12
41,000 shares Union Pacific preferred stock	3,840,000.00

Operating Assets:	
Due from agents and conductors	29,603.16
Due from U. S. Gov't	28,146.28
Due from various persons	15,916.94
Cash on hand	10,233,895.42
Decrease in Certain Liabilities:	
Common stock in hands of company	4,535.00
Sundry bonds held in sinking funds	149,000.00
Bonds outstanding	3,862,000.00
Current Liabilities	
Supply bills	1,350,182.12
Due other companies	110,979.50
Unpresented coupons and old dividends	9,064:00
Accrued interest	56,637.51
Land Income Account	2,972,721.82
	$37,209,149.04

SOURCES OF FUNDS FOR EXPENDITURES.

Decrease in Certain Assets:	
General—Common stock scrip in treasurer's hands	$4,535.00
Operating Assets:	
Materials, rails, ties, fuel, etc.	87,544.62
Bills receivable	80,048.66
Increase in Certain Liabilities:	
Common stock outstanding	26,846,805.00
Bonds owned by company	4,880,000.00
Bonds owned by company fundable into C. & N. W. B'ds	131,000.00
Sinking funds paid	449,897.50
Equipment renewal fund	1,138,681.39
Current Liabilities:	
Payrolls	217,453.44
Dividends declared	937,681.50
Drafts drawn by agents, outstanding	118,862.64
Railroad Surplus Income Acc't	2,316,639.29
	$37,209,149.04

The significant change in the second schedule is the increase in the capital stock. A comparison of the two schedules and the elimination of the common items show that this increase in the liabilities is represented by the increase in the "Cost of Property," "Cost of Securities and Advances to Proprietary Companies," Union Pacific stock and cash, and a decrease in "Bonds Outstanding." The first item is adequately accounted for in a "Construction Account," which also accounts for the $6,000,000 expended on extensions and improvements and charged against "Surplus Income" in the Income Account. This "Construction Account" is found only in the president's report, however. The large increase of $5,774,545.12, in "Cost of Securities and Advances to Proprietary Companies" requires explanation. What companies are these, for what purposes were these advances, et cetera, made, and are they justified from the

standpoint of the Northwestern's stockholders? The president's report creates the inference that they were made for the purpose of construction and improvement of lines, but no further information is anywhere vouchsafed.

An item which comes into prominence in these schedules and almost escapes attention in the balance sheet as published is that of "Land Income Account," which shows a decrease in one year's time of nearly $3,000,000, leaving a total of less than a quarter of a million in the 1906 Balance Sheet. What caused this large decrease? How does this account arise? Do the stockholders get the benefit of this income? It is not included in the general Income Account of the system. There is nothing in the report to throw light on this subject. There is a report of the Land Department, but it merely shows receipts from sales of lands.

In conclusion, the stockholder has not found in this annual report of the Northwestern all the information that is necessary to enable him to judge as to the efficiency of management of the company or the value behind his stock. The general magnitude of earnings makes it seem probable that the present high market price of his stock is justified; but an idea of general probability is not what is wanted. If a single condensed balance sheet be admitted as sufficient, it should at least be comparative; the information in explanation of important changes in the balance sheet from one year to the next is not forthcoming. The income account is not presented in the most useful form, and not all the statistics necessary to verify it and to judge of the efficiency of traffic management are printed. The statistics which are presented are not vouched for by a competent authority independent of the Northwestern's management. Finally, the stockholder has had to do a great deal of unnecessary "figuring" in order to extract the information which was obtained.

Meetings of Societies.

Annual Convention of the American Association of Public Accountants.

Notice is hereby given that the annual meeting of the American Association of Public Accountants, adjourned from Tuesday, October 16th, will be held in the Hartman Hotel, Columbus, Ohio, at 10 a. m., on Tuesday, October 23d, and will be continued during the two following days.

The accompanying programme has been arranged, combining with the regular business of the meeting a discussion of certain subjects of great importance to the profession, as well as several social functions, for some of which the Ohio State Society of Public Accountants have invited the members of the Association to be their guests.

Each member of the Association will have the privilege of inviting two friends to attend all the proceedings as his guests and at his expense. The Association as a whole will invite a certain number of prominent men to attend the banquet as guests of the Association, and in order that all sections of the country may benefit, the President of each affiliated society is requested to send to Mr. J. S. M. Goodloe (President of the Ohio Society of Public Accountants), Chairman of the Special Committee on Annual Meeting, New Hayden Building, Columbus, the names of one or two prominent men in his district, to whom they would like such official invitations sent.

The Executive Committee in issuing this notice to the members desire to point out the advantages which not only the profession at large, but each individual member thereof, will undoubtedly derive from attendance at this meeting, and from the friendly relations with other members of the profession resulting therefrom. They urge the directors of the individual State Societies and the members at large of the Association to use their best individual efforts not only to attend the meeting themselves, but to insure a large and representative attendance from all parts of the country.

The headquarters of the Association during the meeting will be at the Hartman Hotel, Columbus, Ohio, and the Special Com-

mittee on Annual Meeting will be glad to arrange for accommodation there or at other hotels as may be desired.

In order to assist the officials of the Association in making satisfactory arrangements for the reception and entertainment of members, you are requested to fill up and return to the Secretary of the Association, Mr. A. Lowes Dickinson, 54 William Street, New York, the attached form "A." If you also desire to be present at the annual dinner on the evening of Tuesday, October 23d, you are requested to fill up form "B" and send it with your check for $5 per ticket to the Treasurer of the Association, Mr. Guy H. Kennedy, Traction Building, Cincinnati, Ohio, as soon as possible.

The Executive Committee have appointed the following members of the Association a Transportation Committee to arrange accommodations from their respective districts to Columbus:

E. W. Sells, 30 Broad Street, New York, for New York and New Jersey.

John A. Cooper, 1st National Bank Building, Chicago, for Illinois, Minnesota and Wisconsin.

Wm. M. Lybrand, 516 Stephen Girard Building, Philadelphia, for Pennsylvania.

D. L. Grey, Stock Exchange Building, St. Louis, for Missouri and Kansas.

Durand W. Springer, Ann Arbor, Mich., for Michigan.

Guy H. Kennedy, Traction Building, Cincinnati, Ohio, for Ohio and Kentucky.

Harvey S. Chase, 27 State Street, Boston, Mass., for Massachusetts.

E. G. Shorrock, Pioneer Building, Seattle, Wash., for Pacific Coast.

E. S. Elliott, Memphis Trust Building, Memphis, Tenn., for Tennessee.

Should you require any information with regard to transportation, please address the representative on this Committee for your district. A LOWES DICKINSON, *Secretary.*

PROGRAMME OF THE ANNUAL MEETING OF THE AMERICAN ASSOCIATION OF PUBLIC ACCOUNTANTS, TO BE HELD AT COLUMBUS, OHIO, OCTOBER 23, 24, 25, 1906.

PRELIMINARY PROGRAMME.

Tuesday, October 23d.

10.00 a. m. Preliminary Meeting. Addresses of welcome by Governor

of Ohio and Mayor of Columbus. Response by President of American Association.

11.00 a. m. Annual Meeting—Suspension of Rules and Adjournment of Regular Business till 10.00 a. m., Wednesday.

11.15 a. m. Debate on the subject of Accountants' Fees.

1.30 p. m. Adjournment for Luncheon at the Ohio Club, on the invitation of the Ohio State Society of Public Accountants.

2.30 p. m. Meeting of Executive Committee.

3.00 p. m. Automobile Ride for Delegates, Visitors, and Invited Guests.

4.00 p. m. Meeting of Board of Trustees.

7.00 p. m. Dinner at Columbus Country Club, and after dinner Reception and Dance at Columbus Country Club, by invitation of Ohio State Society of Public Accountants.

Wednesday, October 24th.

10.00 a. m. Annual Meeting. Regular Business.

1.30 p. m. Luncheon at Hotel Hartman.

2.15 p. m. Annual Meeting resumed.

4.00 p. m. Meeting of Board of Trustees.

7.30 p. m. Annual Banquet.

Thursday, October 25th.

10.00 a. m. Debates on the subjects of Advertising by Public Accountants and of Audit Companies, at the conclusion of which the Annual Meeting will be adjourned.

1.00 p. m. Luncheon at Arlington Country Club.

2.00 p. m. Meeting of Executive Committee.

3.00 p. m. Annual Meeting of the American Association Golf Club at Arlington Country Club.

Headquarters, Hotel Hartman.

Fall Meeting of New Jersey C. P. A.'S.

The Society of Certified Public Accountants of the State of New Jersey held its fall meeting Tuesday evening, September 11, at the Jersey City Club House, Newark.

There was an attendance of twenty-odd members out of a total membership of forty-five. There were several guests present, including Mr. Ely, Treasurer of Jersey City.

The following delegates were elected to represent the N. J. Society at the meeting of the American Association to be held in October; Frank G. DuBois, C. P. A.; W. Sanders Davies, C. P. A.; Elmer B. Yale, C. P. A., and George Wilkinson, C. P. A.

After the dinner, the President, Mr. Frank G. DuBois, called the meeting to order and requested Mr. W. Sanders Davies to respond to the toast of "Old Boys and Ancient Accounting History." Mr. Davies, speaking from an experience of many years in the profession, explained that the aim was not entirely

the detection of criminal actions, but the advocacy and installment of a system of accounting that would show in the simplest and clearest manner the condition of the business for which the accounts were to be kept. Certified public accountants, he said, were not so anxious to capture a fee from their clients as they were to present to their client a statement which would show him in brief a history of the client's transactions and their results. The certified public accountant differs from the lawyer in the treatment of cases in which he is called in that he requires "honesty and integrity" from his client as well as from the opponent if any. Any certified public accountant who does not live up to this rule would be immediately disbarred from practice of his profession when discovered in any such questionable transaction.

Mr. George Wilkinson, being requested to respond to the toast, "The C. P. A. Movement," gave briefly a history commencing with the passage of the original law in the State of New York in the year 1896, and stated that to-day there were eleven states, each of which had enacted a C. P. A. law, all of which are about on the same lines and very similar to the New Jersey State law. Also that the various state societies have banded themselves into a national organization known as the American Association of Public Accountants.

Mr. Elmer B. Yale responded to the toast, "New Jersey State Board of Public Accountants," and briefly outlined the duties and requirements of the board. He stated that forty-three accountants had received commissions from the state to practice their profession.

Mr. Ely, Treasurer of Jersey City, replied to the toast, "Jersey City Accounting." His remarks were received with appreciation and applause.

ACCOUNTANTS AND THE BANKS.

Mr. Davies read the following preamble and resolution in relation to the recent bank defalcations:

Mr. President and fellow members of the Society of Certified Public Accountants of the State of New Jersey:—

Miscellaneous business being the order of the day, I wish to speak on a subject which at the moment is more strikingly be-

fore the public than I think it has ever been before. I refer to the serious defalcations which have recently come to light in certain banks and trust companies, causing great hardships to many of the depositors, and in some cases to the stockholders of the various concerns whose treasuries have been looted.

In every instance it is apparent that the frauds might, and probably would, have been detected almost in their inception had adequate examinations been made by disinterested parties, and by this I mean thorough examinations embracing the checking of the collateral securities and not merely a mechanical checking of the figures shown by the books.

It seems to me that it is high time that we certified public accountants took some concerted action that would have for its object the passing of laws which would protect the depositors and stockholders of banks and trust companies from a repetition of the losses such as have been caused by officers' defalcations.

Now who are the persons most vitally interested in the success of banks and trust companies? Are the stockholders? I answer, No, because their ability is defined and is commensurate with their stock holdings.

Are the depositors? and I answer, Yes, because they are liable to lose all their balances or so much as cannot be made good on realization of the assets.

Permit me to cite figures to prove my assertion. A bank has a capital of $1,000,000 and surplus of $1,000,000, with deposits of $20,000,000. The depositors' interest in the assets is 10/11ths, whilst the stockholders' interest is only 1/11th. Thus: total assets $22,000,000, 20/22ds=10/11ths, 2/22ds=1/11th.

This being so, it seems to me that the rights of the depositors to know that their deposits are fully protected should be recognized by law and the privilege accorded to them to appoint annually, in meeting, auditors to examine the affairs of the banks and trust companies in detail, who would be authorized to report to them, in meeting, whether they found the affairs in accordance with the published accounts and the securities held against loans actually in the companies' possession, and if the securities were apparently not such as would protect the loans to report this also to the depositors at the same meeting.

These auditors should be certified public accountants in the states where such are legally recognized, and would consequently be men who are amenable to the law insomuch that, failing in their duties, they would be liable to have their certificates revoked.

Now, as to the exact detailed working of this suggestion, I am not at the moment in a position to submit a plan, but in order that the matter may have due consideration at the hands of the profession, I offer this resolution:

Resolved, That having heard the remarks of W. Sanders Davies in relation to the necessity of recognizing the rights of depositors to appoint auditors to make independent examinations of the affairs of banks and trust companies, and after discussion thereon, this society is of opinion that such an audit would materially protect the interests of both depositors and stockholders, and that a copy of such remarks and this resolution be referred to the American Association of Public Accountants, so that the matter may be more fully taken under consideration and concerted action taken in connection therewith.

Notes from Correspondents.

ANN ARBOR, MICH., Sept. 15, 1906.

EDITORS JOURNAL OF ACCOUNTANCY, New York City.

GENTLEMEN.—I am enclosing you the questions as given by the Michigan State Board of Accountancy at the first examination held in Detroit, July 27-28.

Governor Warner appointed as the first board, John H. Clegg of Detroit, George A. Horner of Grand Rapids, and Hon. H. M. Zimmerman of Pontiac, the first two being public accountants and the last an attorney. Prior to the announcement of any rules, but soon after the board had sent out application blanks, the following communication was sent them: "At a meeting of the Michigan Association of Public Accountants, it was unanimously voted to request the Michigan State Board of Accountancy not to issue any certificates under the waiver clause. In some states the question has already arisen as to the relative value of certificates issued after examination and those issues under the waiver clause, to the detriment of the latter. As this body was the organization which secured the passage of the law in Michigan, we are anxious that the certificate should represent the highest possible standard."

The board adopted the request.

Eighteen candidates presented themselves for the examination in July. A number of other accountants had filed their applications and in some cases paid their fees, but were prevented by other engagements from taking the examination. It is expected that the December class will be about as large.

Those who successfully passed the examination were: Charles D. Fleming, W. D. Gridley, Arthur S. Guerin, John J. Jerome and Fred Wixson of Detroit; James E. Hardman, Joseph Horner, A. B. Hulsapple, Will A. Voss and Charles H. Winke of Grand Rapids; Norman E. Webster of Kalamazoo (Washington, D. C.), Harry Ruple of Saginaw and D. W. Springer of Ann Arbor. Commissions to practice as certified public accountants have been awarded to the above and to Messrs. Clegg and Horner.—D. W. SPRINGER, *Pres. Mich. Assn. of Certified Public Accountants.*

EDITOR'S NOTE.—Lack of space prevents our publication of these questions in this issue of THE JOURNAL. They will appear in the next number.

Book Department.

PENNSYLVANIA BUSINESS LAW. A Practical Handbook for Business Men and Lawyers. By John J. Sullivan, A. M., LL. B., Member of the Philadelphia Bar and Instructor in Commercial Law at the University of Pennsylvania. 700 pages. Price $4.00. Accountancy Publishing Co., New York.

This book combines a thorough treatment of the subject with a simple and untechnical method of statement. The legal rules and the reasons for them are set forth so clearly that even a high school boy could read the work with interest and profit. Hundreds of cases are cited to sustain the text, as well as scores of Pennsylvania statutes. The Pennsylvania statute governing *Negotiable Instruments,* which contains 198 sections, is printed in full, as well as the *United States Bankruptcy Act* and the *Pennsylvania Insolvency Act.*

The practical character of the work is maintained throughout. Most books on business law attempt to expound such general legal principles as are more or less applicable in most states of the Union. The wide difference between the law in various states makes it impossible to write a work of this kind within the limits of a single volume which will be reliable and at the same time complete enough to serve as a helpful reference to the precise details of Pennsylvania law. For instance, the law of Pennsylvania (unlike that of many other states) does not require any contracts for the sale of goods to be put in writing; and yet Pennsylvanians, consulting some of the current books on commercial law, would be met with the statement that a written memorandum is required in the case of most such contracts. This is one out of hundreds of points of difference between the law in Pennsylvania and elsewhere, for the statutes passed by the various state legislatures and the decisions of the highest state courts vary widely from each other.

The legal system which has been developed in Pennsylvania is worthy of every citizen's study. Apart from the utility of this study, there is its great educational advantage. It is a science which combines the exactness of logic with such flexibility that it can be adapted to meet the ever changing needs of an American commonwealth. It is being used more and more as a general

study in progressive *Colleges and High Schools.* A knowledge of the law can no longer be regarded as the property of lawyers alone. Everybody is bound at his peril to know it so far as it applies to himself and his affairs. Ignorance of it is no excuse.

The five books into which the volume is divided are arranged in a natural order. The first book concerns *Contracts* in general, and shows how contracts must be formed, whom they affect, how they are interpreted, and how they are terminated.

The second book begins by showing how contracts may be formed through agents representing the parties in interest. The chapters on *Agency* explain also the rights and liabilities of agents and their employers, as respects each other and as respects third parties. In the succeeding chapters on *Partnership,* the formation and termination of partnerships are fully studied, as well as the rights and obligations of firm members, and the statutes regulating special partners and limited partnerships. Book second concludes with a number of chapters about *Pennsylvania Corporations.* The formation and the dissolution of corporations are well treated, and numerous practical suggestions are given for the guidance of business men and lawyers. Four chapters are devoted to the rights and liabilities of stockholders and other corporate members. The rights and obligations of the directors and the principal officers of corporations are carefully discussed. Something is said also about the merger and consolidation of corporations, and about the taxes and bonus imposed by the State of Pennsylvania on various domestic and foreign companies. This valuable part of the work concludes with a brief treatment of the Pennsylvania statutes relating to foreign companies.

Book third deals with *Property Rights* and special contracts concerning property. Sales and leases of *Real Estate* are treated, as well as similar transactions affecting *Personal Property.* A chapter is devoted to the transportation of personal property by *Common Carriers.* In the fourth book contracts of *Suretyship and Guaranty* receive consideration, together with certain important rules of *Insurance* law.

Book fifth deals with the *Estates of Decedents.* The successive steps in the administration of estates are indicated, from the time when the executor or administrator is first appointed until his duties are finally discharged. *Wills* and the *Intestate Law,* which governs the distribution of an estate when there is no will,

are examined in detail. The volume ends with a chapter on *Trust Estates,* which mentions the various kinds of trusts, the powers and duties of trustees and certain rules about the creation of trust estates. A number of forms for the guidance of business men and lawyers are introduced in appropriate places. Specimens of accounts used in bankruptcy, real estate and Orphans' Court matters are also included. These accounts are fully explained in the text.

No pains have been spared to make this work a thorough exposition of Pennsylvania Business Law. It covers the law down to date, referring to a number of the important statutes passed at the last general session of the state legislature in 1905, and citing many cases decided by the courts in 1906. The author, Mr. Sullivan, has a comprehensive knowledge of the subject which he writes about, gained in practical experience at the Philadelphia Bar, as well as a clear and simple method of teaching legal principles.

A Simple Cost System for Banks.

The September number of the *Bankers' Magazine* prints an article entitled "Cost of Handling Checking Accounts," by Mr. John F. Wilson, manager of the department of bank examinations for a firm of certified public accountants. Mr. Wilson is an experienced national bank examiner, formerly for several years on the Chicago staff of the comptroller of the currency.

This much discussed theme—how to compute the actual cost of the checking accounts in a commercial bank—Mr. Wilson treats very plainly and convincingly. The viewpoint is original and discloses what perhaps will prove to be a correct solution of an intricate and complicated problem. His plan provides a method of computing the cost to a bank of carrying each, or any one, of its customers' accounts, calculated on the basis of the number of deposits and checks involved. It also tells the profit on each customer's account, or the loss, as the case may be.

Mr. Wilson's plan needs no corps of expert accountants to install it; it calls for no addition to the clerical staff of the bank and involves no printing and stationery. The article is well worth the attention of bankers and of public accountants.

THE JOURNAL OF ACCOUNTANCY

MAY, 1906

VOLUME 2. NUMBER 1.

The Construction and Finances of Interurban Electric Railroads
THOMAS CONWAY, Jr.

Types of Street Railway Securities
EARL DEAN HOWARD, PH. D.

Passenger Receipts vs. Passenger Revenue
J. S. M. GOODLOE

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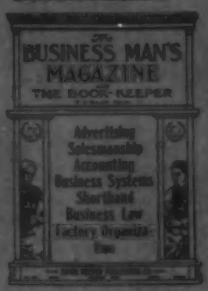

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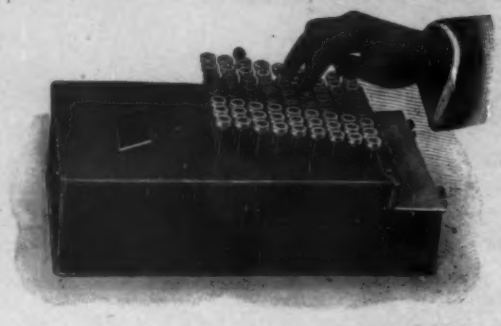

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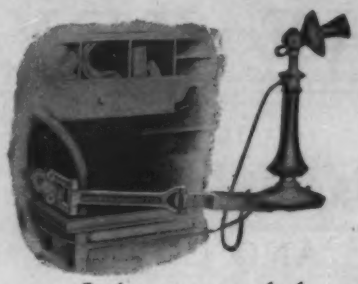

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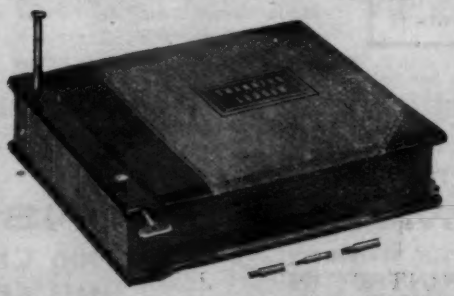

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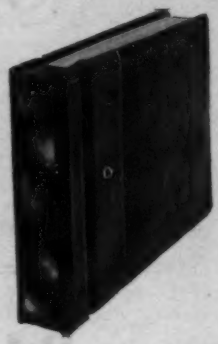

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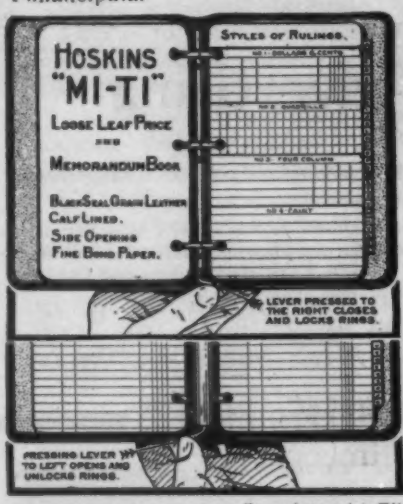

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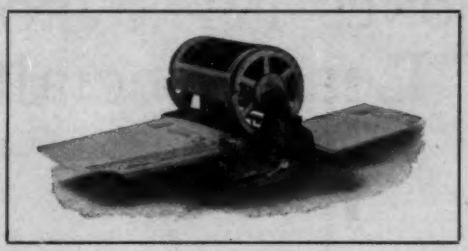

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